AVIATION WEEK

A McGRAW-HILL PUBLICATION

NOVEMBER 29, 1948

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THE PRODUCTS illustrated on this page are typical of a wide range of precision units manufactured by the Aircraft Accessories Division of our company at "*Tapco*".

This division has specialized for years in the engineering and production of fuel systems for jet and piston-engine military planes, as well as commercial and personal aircraft of all types. It also designs and has unexcelled equipment for the production of the intricate compressor assemblies of steel, aluminum or magnesium, used for supercharging aircraft engines.

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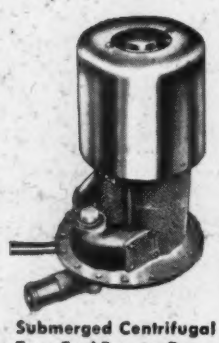
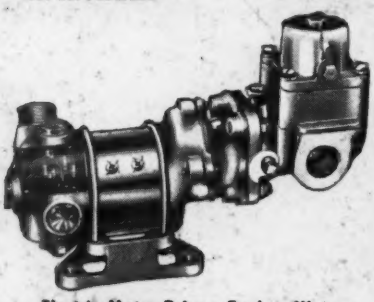
We invite engine and plane builders and commercial airline operators to use the development, testing and production facilities of our Aircraft Accessories Division.

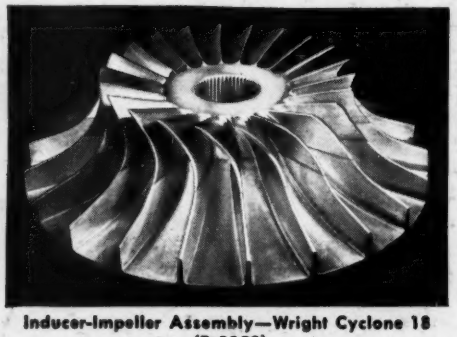


Submerged Centrifugal Type Fuel Booster Pump for Jet Aircraft.

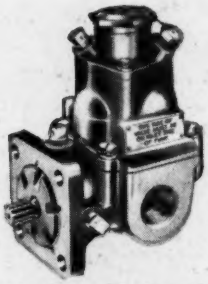
Submerged Centrifugal Type Fuel Booster Pump.



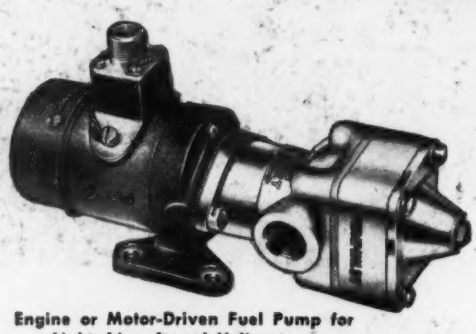
Electric Motor-Driven Fuel or Water Injection Pump.



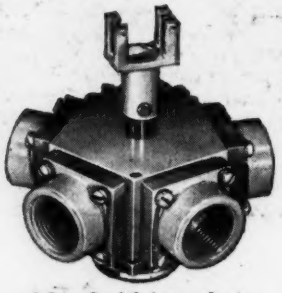
Inducer-Impeller Assembly—Wright Cyclone 18 (R-3350)



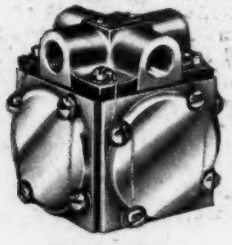
Engine-Driven Fuel or Water Injection Pump.



Engine or Motor-Driven Fuel Pump for Light Aircraft and Helicopters.



5-Port Fuel Selector Cock.



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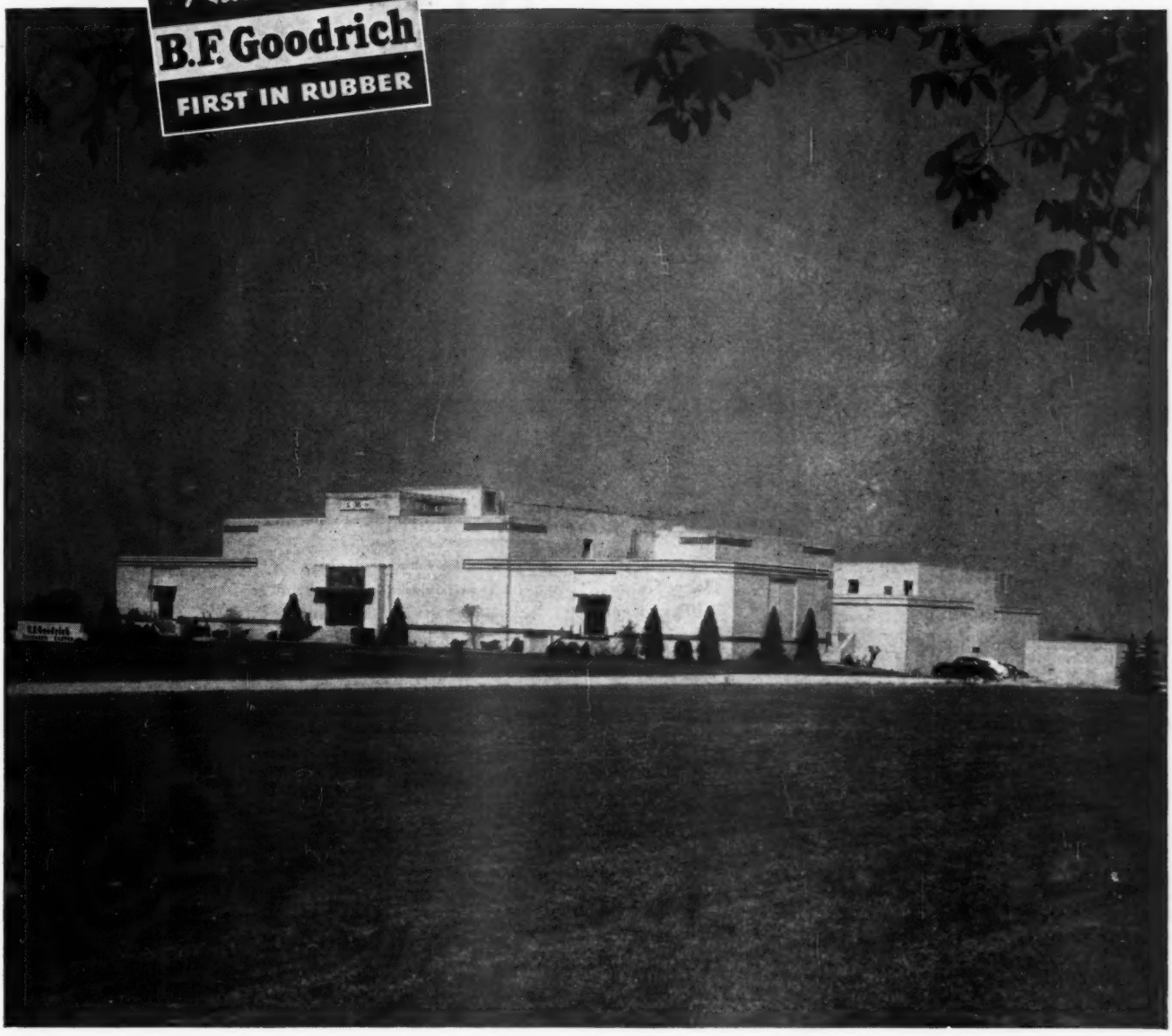

The house with 1000 doors

THIS is the new B. F. Goodrich Research Center — a place where every opportunity for improvement is regarded as a door to be opened. B. F. Goodrich scientists estimate that there are 1,000 such opportunities in rubber and flexible materials — 1,000 doors at which they constantly rap.

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Another important aeronautical development of B. F. Goodrich scientists is the Pressure Sealing Zipper, used extensively on waterproof containers for electrical and radar equipment, access doors and fume curtains, pressure doors, aileron and control surfaces, inverter covers, endless seals on ducts, and exposure suits used by the army and navy.

Still other problems are being resolved to produce wheels and brakes with lighter, simpler, easier to maintain design for both large and small planes; tires that handle high speed and heavy-load landings; and electric rubber, a new method of fighting ice, which is now being applied to jet aircraft as well as propeller-driven planes.

But this is just a beginning. Look for still greater things to come from the new B. F. Goodrich Research Center, the world's most complete center of rubber research. B. F. Goodrich research works constantly to make flying ever better, cheaper, safer. For help with your problems, write to *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

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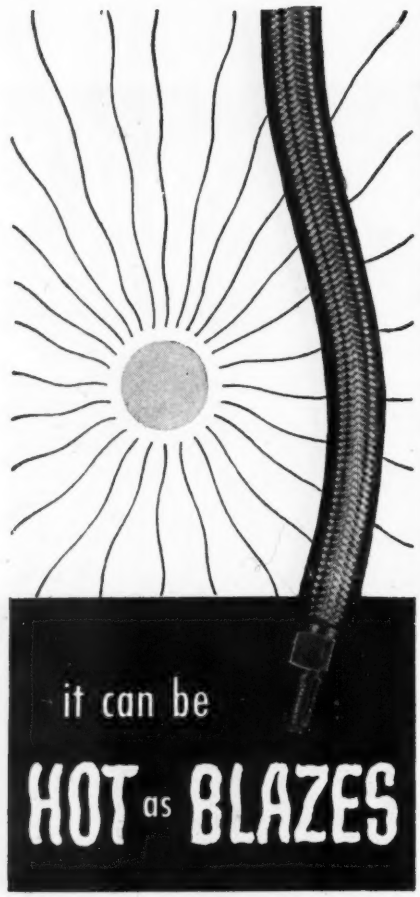

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Vol. 49, No. 22

AVIATION WEEK

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Contractors to the Armed Services

Looking Ahead to 1960

By John K. Northrop
(President, Northrop Aircraft, Inc., Hawthorne, Calif.)

Predictions concerning the future of aviation are a dime a dozen. They vary widely and are worth little unless substantiated by a broad cross-section of informed opinion. Even then they may be wide of the mark. In 1938 a British aviation magazine invited a number of the foremost English engineers to write aeronautical forecasts. A review of the printed record furnishes an interesting comparison with the facts. It was then almost unanimously believed that large flying boats would be the universal long range air transport vehicle, yet today at least 95 percent of long range transport is by landplane, to which the ocean holds no terror .

Almost all of the experts thought that military plane speeds could never exceed 600 mph. and that 200 to 250 was the all-time economic limit for passenger transports. Both categories have already exceeded these estimates by a wide margin. The individual who seemed to have the best insight into the future on most matters though it would be at least 10 years before pressurized cabin transports would be practical, yet such airplanes were in regular airline service in the United States within two years. Wood was recommended by one designer as the most suitable material for military airplanes; another thought 3000 hp. to be the all-time maximum power that could be expected from aeronautical engines. . . .

The comparisons certainly teach caution in taking any such predictions too seriously, and prove, if anything, that the best consensus of opinion will be ultra-conservative, even in the high velocity business of aviation.

Here I am committed to an extension of aviation history to 1960, which I will undertake, keeping the above qualifications in mind. My opinions are based on over 30 years active participation in the history of aviation, but certainly do not represent any broad consensus of the ideas of aviation authorities.

Guided Missile Future

First, and most important, it is believed that pilotless guided missiles will come into military use within two years and will form the main backbone of the Air Force's offense and defense by 1960. Although several intermediate steps will be involved, two predominant types will hold the stage at that time. The first of these will be a long range winged missile propelled by suitable power plants now in existence and capable of carrying large loads of TNT or any other destructive warhead. The know-how for this missile, operating at speeds of approximately 600 mph. is presently available and is capable of extension to over 1000 mph. before 1960. It will have sufficient range for launching from continental United States against any desired target in the northern hemisphere and will be navigated by entirely automatic means having a higher degree of accuracy than any now in use with manned aircraft.

Such missiles will largely, if not completely, supplant the long range bomber of the strategic air forces and, all things considered, will deliver a pound of warhead at a lower cost to the country's economy than has ever been possible with manned aircraft. They will have many advantages over present piloted planes, some of the principal ones being instantaneous mobility, high accuracy, and negligible maintenance costs. Their use will move the focus of military hazard from the cockpit of a bomber to the industrial areas in the heart of combatant nations. . . .

Interceptor Missiles

The second type of missile predicted for general use will be a ground-to-air interceptor which will almost completely replace manned fighter aircraft. This missile will be much smaller than present fighters, it will be rocket powered, equipped with automatic devices for guidance to its objective, and will constitute the sole effective defense against a mass attack from enemy long range missiles. The balance of power in the offensive-defensive conflict will depend on the efficiency of detecting apparatus and the organization and coordination of defense forces operating the ground-to-air defensive missiles.

The offensive missile definitely will have the advantage. Some will be intercepted but not a large percentage in a coordinated mass attack. Tremendous value to the aggressor will lie in the unexpected or unannounced offensive blow. It will require the development of fully automatic detection and defensive missile launching equipment to give a reasonable degree of security against enemy attack. . . .

Manned military aircraft will probably be limited to transports of various sizes and categories. The transport will remain an essential factor in the efficient conduct of any military operation and it is believed the military transport will in general be quite similar to its civilian counterpart in 1960, as it is today.

Long Range Transports

The long range transport for both civilian and military use is envisioned as the cleanest possible design. It will be a flying wing having a gross weight between 100,000 and 200,000 lb. and will have a direct operating cost of less than 5 cents per ton mile of payload. Because of the continuing need of fuel economy in its operation it will probably cruise at about 500 mph. and be driven by gas turbine propeller power plants rather than turbojets. . . .

If our development of atomic power plants for aircraft is vigorously pursued, we can probably have large airplanes driven by nuclear energy in service well before 1960. They will have unlimited range and very high speeds. Such ships will be enormously expensive and therefore comparatively few in number. Except for specialized service they will be inferior to the guided missile in their ability to deliver a warhead to enemy territory at the lowest cost to our country's economy.

In the field of power plants large vistas of improvement lie open before 1960. If the turbojet is to be used effectively in long range supersonic missiles, a large increase in thrust per square foot of frontal area must be achieved. Methods are known whereby this factor can be at least doubled over the best turbojet power plants now in use in this country. Such improvement would approximately double the range of a long range guided missile flying at speeds of from 1200 to 1500 mph.

The survival of American civilization must be left pretty much in the hands of the diplomats. Science has far outreached our ability to control its destructive potential. The sneak attack can be all powerful and completely devastating in effect. Our great cities with their marvelous industrial powers for good or evil may become our first line trenches long before 1960.

You've got to be GOOD to fly in the new THUNDERJETS!

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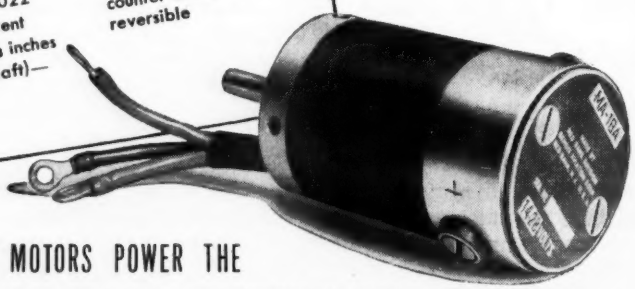

BENDIX DC MOTORS POWER THE
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AVIATION CALENDAR

Nov. 28-Dec. 3—American Society of Mechanical Engineers, annual meeting, Hotel Pennsylvania, New York City.

Dec. 1-2—Aircraft Industries Assn., Air Force-Navy-Industry (ATC) meeting on accessory oil seals, Washington, D. C.

Dec. 2—Meeting on turbojet use and maintenance sponsored by Institute of the Aeronautical Sciences, McGraw-Hill Building auditorium, New York, N. Y.

Dec. 2-5—Annual meeting of the Society for Experimental Stress Analysis, Hotel Commodore, New York City.

Dec. 2-5—Fourth annual international aviation celebration, El Paso.

Dec. 3—Meeting on magnesium, sponsored by Magnesium Assn. and Mellon Institute, Mellon Institute auditorium, Pittsburgh.

Dec. 3—American Helicopter Society, Inc., annual dinner and presentation of honorary fellowships, Hotel New Yorker, New York City.

Dec. 14-15—Aircraft Industries Assn., Air Force-Navy-Industry meeting on accessory drive requirements, Power Plant Lab., Wright-Paterson Air Force Base, Dayton, Ohio.

Dec. 17—Annual Wright Brothers Lecture, Institute of the Aeronautical Sciences, U. S. Chamber of Commerce Bldg., Washington, D. C.

Jan. 5, 1949—Florida Flying Alligator Club, 14th annual reunion, Melbourne, Fla.

Jan. 10-14—Society of Automotive Engineers, Annual Meeting and Engineering Display, Hotel Book-Cadillac, Detroit, Mich.

Jan. 11—ICAO Communications Division, Montreal.

Jan. 12-14—Commercial Spray Operators conference, University of Illinois, Urbana, Ill.

Jan. 13-14—Fourth NAS Council Meeting, AIA offices, Hollywood, Calif.

Jan. 18-Feb. 11—Third Air Transportation Institute, American University, Washington, D. C.

Jan. 24—Honors Night dinner, Institute of the Aeronautical Sciences, Hotel Astor, New York City.

Jan. 24-27—IAS seventeenth annual meeting, Hotel Astor, New York City.

Jan. 27—Society of Automotive Engineers, metropolitan section, fuels and lubricants meeting, Engineering Societies Bldg., New York City.

Feb. 8—ICAO Operations Division, Montreal.

Feb. 22—ICAO Airworthiness Division, Montreal.

Mar. 3—Society of Automotive Engineers metropolitan section, air transport meeting, Engineering Societies Bldg., New York City.

July 3-4—First Annual Southern California International Air Race, Long Beach.

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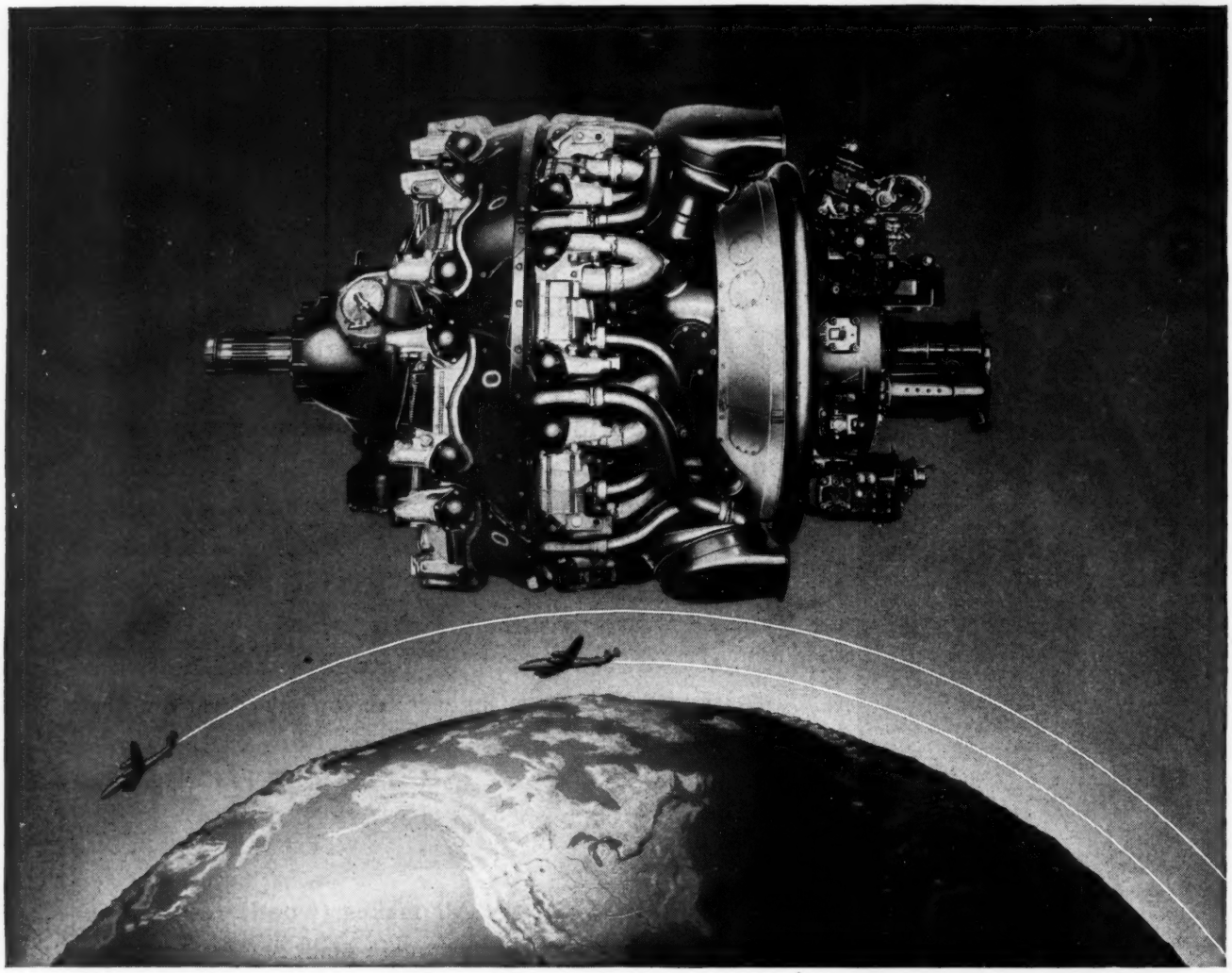

ANNOUNCING THE NEW *Turbo-Cyclone 18* COMPOUND ENGINE

Longer range, increased payload, greater economy and higher power output are provided by this latest Wright Aeronautical Corporation development.

▸ The Turbo-Cyclone 18 combines the dependable performance of the reciprocating engine with the simplicity and compactness of the gas turbine. It utilizes a sizable portion of the energy in the exhaust gases of a reciprocating engine to drive three turbines that are geared back to the engine crankshaft.

▸ To the operator the Turbo-Cyclone 18 offers a choice of (1) a reduction in specific fuel consumption of as much as 20%, (2) a 20% increase in range on the same amount of fuel, (3) a substantial increase in payload because of the reduced fuel consumption, or (4) a 20% increase in power for the same amount of fuel. Additional bonuses include . . .

▸ . . . *lower specific weight*—less than one pound per horsepower developed . . . *ease of installation in existing aircraft*—fits within cowl lines of existing nacelle . . . *ease of maintenance*—no additional cylinders—readily removable turbine units . . . *ease of operation*—no additional controls—no specialized training of flight crews.

▸ The production of the Turbo-Cyclone 18 fulfills today's requirements for optimum economy and performance in long range aircraft.

▸ Another example of Wright engineering leadership in developing new power-plants for the aviation industry.

POWER FOR AIR PROGRESS

WRIGHT

Aeronautical Corporation • Wood-Ridge, New Jersey

A DIVISION OF CURTISS WRIGHT FIRST IN FLIGHT

INDUSTRY OBSERVER

►McDonnell has solved the formerly vexing problem of starting the ram jet engines on its experimental helicopter, "Little Henry". Formerly the blades were whirled to starting speed by an electric motor driven crank. Marquardt used a compressed air hose to provide initial compression for its ram jet helicopter. Now McDonnell has worked out a system of whirling the blades by hand that will allow the ram jets to be started.

►Protection, Inc., of Los Angeles has received orders for approximately 350 of its Toptex crash-protection helmet for jet pilots (AVIATION WEEK, Oct. 4). Navy wants 200 for service testing, Grumman ordered 35 to equip its test pilots and the armored service of the army field forces will test more than 100 on personnel in high speed tanks.

►Al Conover, North American test pilot, credits the Toptex helmet with saving his life during dive tests of a North American Fury (FJ-1) at Patuxent River, Md. The canopy came off during a dive, and, as common with the bubble type canopy used on most jet fighters, attempted to scoop out the cockpit as it tore loose. Conover suffered a concussion that knocked him unconscious. He did not fully recover consciousness until after he landed the damaged plane. Analysis of forces taken by the helmet's laminated glass fiber outer liner showed that Conover would have been decapitated without the helmet.

►Chance Vought division of United Aircraft will continue turning out parts for the F6U-1 Pirate jet fighter at its Stratford, Conn., plant until next June, although production assembly line for the plane will be set up in the new Dallas plant. Production of F4U-5 Corsairs has ended at Stratford and will continue for the Navy at Dallas. Pirate production is expected to begin next Spring at Dallas.

►Air Force is using Bartow high intensity runway lights, manufactured by Line Material Co., on both the Templehof and Rhein/Main Airports on the Berlin airlift. The high intensity runway lights combined with high intensity approach lights and radar are expected to materially aid airlift operations during the winter bad weather season.

►Although Floyd Odlum was still dickering with Reconstruction Finance Corp. and private financial interests last week for financing the Convair Equipment Corp., Consolidated Vultee Aircraft Corp. apparently has no doubt of the eventual establishment of the plane-leasing subsidiary. Convair already is asking for bids from suppliers for the 100 Convair-Liners "we are furnishing the Convair Equipment Corp."

►Navy will shortly put its two double-decker Lockheed Constitutions into transcontinental service for the Military Air Transport Service on a super "hotshot" service to replace the C-54s diverted to the Berlin airlift last summer. The Constitution can carry 130 passengers or 30,000 lb. of cargo on the Washington-San Francisco run and average three round trips a week. Powered by four Pratt & Whitney Wasp Majors, the Constitution cruises at 260 mph.

►Prototype Saab Scandia transport is scheduled to go into cargo service with SAS/ABA next month. Prototype has completed 452 hr. in the air including a 37,200 kilometer tour of Europe. Plane will sell for about $350,000 and SAS/ABA has ordered 10 passenger versions which it expects to get by the summer of 1949.

►The Australian cabinet has decided to cancel production plans for the Tudor II transport. Decision was made because of unfavorable performance of the prototype which ultimately crashed in a test flight in England. The Commonwealth Aircraft Corp. spent about $500,000 on tooling and other preparations. It is likely that Bristol freighters will be built in place of the Tudor II. Meanwhile, the CAC is proceeding with its program of 73 Lincoln bombers, 39 of which have yet to be delivered.

►Trans-Canada Airlines has ordered an unspecified number of Avro XC-102 four jet transports for service on its transcontinental routes, according to A. V. Roe, Ltd., of Toronto. This is the first airline order for the Canadian-built jet transport, which is scheduled to be test flown next February at Toronto.

NEWS DIGEST

DOMESTIC

Ralph V. Hunt resigned as vice president, comptroller, and director of Douglas Aircraft Co. He had been with Douglas since 1940. He has not announced future plans.

Matthew M. Gouger will leave the Glenn L. Martin Co. Dec. 31 to join another company. At Martin he has been vice president, personnel and public relations, and a director.

Consolidated Vultee-Northrop merger definitely is off, and Northrop has so informed Floyd Odlum, Convair board chairman. Northrop officials told AVIATION WEEK that the merger plan is not acceptable in its present form.

FINANCIAL

United Aircraft Corp. reports net income of $7,562,220 for nine months ending Sept. 30 on sales of $157,250,707. For third quarter ending Sept. 30, net was $1,818,489 on sales of $47,801,063. Contracts, orders and letters of intent at Sept. 30 amounted to about $335 million.

Lockheed Aircraft Corp. declared its third 50 cent dividend of the year, payable Dec. 20 to stockholders of record Dec. 3.

Menasco Mfg. Co. reports net profit of $62,628 for four months ending Oct. 30 on sales of $1,197,271. Backlog early in November amounted to about $4,850,000.

Beech Aircraft Corp. reports net income of $2,213,626 on sales of $24,141,120 for the fiscal year ended Sept. 30. The previous year, loss of $1,816,469 was taken on sales of $26,211,411.

FOREIGN

International Scheduled Airlines have begun a study of "tourist class" rates looking toward institution of worldwide skycoach service by the fall of 1949, it was disclosed last week by Willis T. Lipscomb, chairman of the joint traffic conference of the International Air Transport Association, which just concluded a meeting in Bermuda.

Australian National Airways has bought 48 percent of the stock of the Dominion of Ceylon's national airline, Air Ceylon. Air Ceylon will be operated under ANA's supervision for at least ten years, after which the dominion government may buy back ANA's shares at market value.

British Overseas Airways Corp. is trying to obtain the concession to operate the Italian military airport at Taranto, while KLM Royal Dutch Airlines already has obtained the concession for the Italian airport of Bracciano.

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AVIATION WEEK

Nov. 29, 1948

Navy Unwraps Its Fastest Fighter

By Robert Hotz

PATUXENT RIVER, Md.—Navy unveiled its fastest jet fighter here last week—the Chance Vought Cutlass (XF7U-1).

The twin jet, tailless, sweptwing Cutlass (AVIATION WEEK, Oct. 18) is the first Navy fighter designed for supersonic operations. Its speed range with its present power plants (two Westinghouse J-34 jet engines with Solar afterburners) is in the 650-700 mph. area.

Significance of the Cutlass from the Navy point of view is that it again closes the performance gap between carrier and land-based fighters.

Performance capabilities of the Cutlass are roughly comparable to the U. S. Air Force's F-86A, built by North American and the XF-88 made by McDonnell.

▶**Post-War Design**—The Cutlass is strictly a post-war design based on the results of wind tunnel research before a piloted aircraft actually flew at supersonic speed. The Chance Vought design team that began work on the Cutlass design in 1946 was headed by Paul Baker, chief engineer of the firm and F. N. Dickerman, asst. chief engineer.

Cutlass features the two characteristics early wind tunnel research indicated were required for performance up to Mach 1.8—a low aspect ratio and sweptback wing. The short and stubby wings of the Cutlass have an extremely low aspect ratio and a sweepback of 38 deg.

Only other plane incorporating both these features is the Douglas D-558-2, now undergoing tests at Muroc, which is strictly a research plane. Thus the Cutlass will be the first tactical aircraft to test both these principals in operational flying at high Mach numbers.

Another problem predicted in high speed flight—heavy tail loadings and buffeting—has been eliminated by substitution for conventional empennage of two sweptback vertical fins midway along each wing. In addition to reducing drag considerably, the double fin configuration increases lateral stability and maneuverability of the tailless design.

Both fins have rudder controls in addition to the combination elevator-aileron controls (called "ailevators" by Chance Vought) on the trailing edge of the wings stretching from the fin to wing-tip. Speed brakes are located along the trailing edge from the fin to the fuselage. Wings fold at the fins for carrier storage.

Paul Baker stressed that the Cutlass is radical only in appearance and actually represents the logical design for a high Mach number fighter. He said that despite the low aspect ratio of the Cutlass wings they have a relatively large area, giving the plane a relatively low wing loading for a high speed aircraft. Baker emphasized that the Cutlass design was intended to extend maneuverability of the plane up through high Mach numbers and high altitude performance.

▶**Hydraulic Controls**—Controls are hydraulic-powered to handle the heavy stick forces at high Mach numbers. Artificial feel has been incorporated to simulate control reaction for the pilot similar to those on conventional planes. An emergency manual control system is available through duplicate spring-loaded tabs on rudders and ailevators. The Cutlass uses leading edge wing flaps to increase the lift of its sweptback wing at low speeds required for landing and during take-off.

Unusually heavy construction embodied in the tricycle landing gear gives a clue to the relatively high gross weight of the Cutlass and the tremendous impacts the gear must take on carrier landings. Wheels are of particularly sturdy construction. Shock struts are more nearly the size of those on a DC-3 than those normally associated with fighter type construction.

▶**Rests at Angle**—At rest on the ground the Cutlass is cocked at a 20-deg. angle with the nose nearly 15 ft. in the air, and the stainless steel pipes of the after burners only a few feet off the ground. Among other advantages of this angle is the ease of carrier landings since the retractable tail hook is located between the ends of the two afterburner pipes.

Navy has experienced some trouble from tailpipe interference during simulated carrier landings of other type jet fighters. Nose wheel folds back into the fuselage while main wheels retract into wells at base of vertical fin.

Baker indicated that the Cutlass was designed to take more powerful powerplants than now are installed. He also said it was designed from the start to take afterburners. The Solar afterburners, which can give up to 20 percent additional thrust, are intended only for short emergency use during tactical maneuvers and during initial climb, because of their high fuel consumption.

Baker also pointed out that the Cutlass was designed as an all-purpose fighter rather than strictly an interceptor, and presumably there are night fighter, photo-reconnaissance and attack modifications in the mill.

▶**Jet Installation**—The two Westinghouse jets are installed in the short fuselage with intakes located at wing roots. Tail pipes extend beyond the fuselage.

The bubble canopy cockpit is located far forward, offering the pilot excellent visibility. Landing light is installed flush in the nose. All radio and radar antennas are also flush although some protruding antennas are installed on the first experimental model for test purposes.

Similarly, two large booms on each wing tip house yaw meters. Pitot tube is located at the tip of one fin. Armament will consist of four 20mm. cannon mounted in pairs on each side of the nose.

Several hundred pounds of magnesium have been used for skin covering on various parts of the Cutlass.

▶**Test Team**—The first experimental model of the Cutlass has been at Naval Air Test Center here for more than a month but it still is undergoing Phase I tests under supervision of a 20-man Chance Vought team of which the principal members are Dickerman; W. H. B. Millar, chief experimental test pilot; J. R. (Bob) Baker, test pilot who made the first flight on Sept. 29 and has done most of the flying since; and Conrad Lau, aerodynamicist.

Initial model now has about 16 hr. of time logged in 26 flights. Neither leading edge wing flaps nor afterburners have yet been tested in flight. Second experimental model is nearing completion at Vought's Stratford, Conn., plant. Production on a $10 million Navy order for 19 Cutlasses will be handled at the new Vought Dallas plant.

▶**Trapnell Demonstrates**—In a demonstration test flight here, Capt. Trapnell held the Cutlass down to 500 mph. in level flight but gave ample evidence of its high rate of climb and relatively high maneuverability.

From Trapnell's performance it seems safe to conclude that the Cutlass has one of the shortest rates of turn of any high speed jet fighter now flying or in immediate prospect, with the exception of the McDonnell XF-85 parasite fighter.

CAA Asks Revised Procurement Method

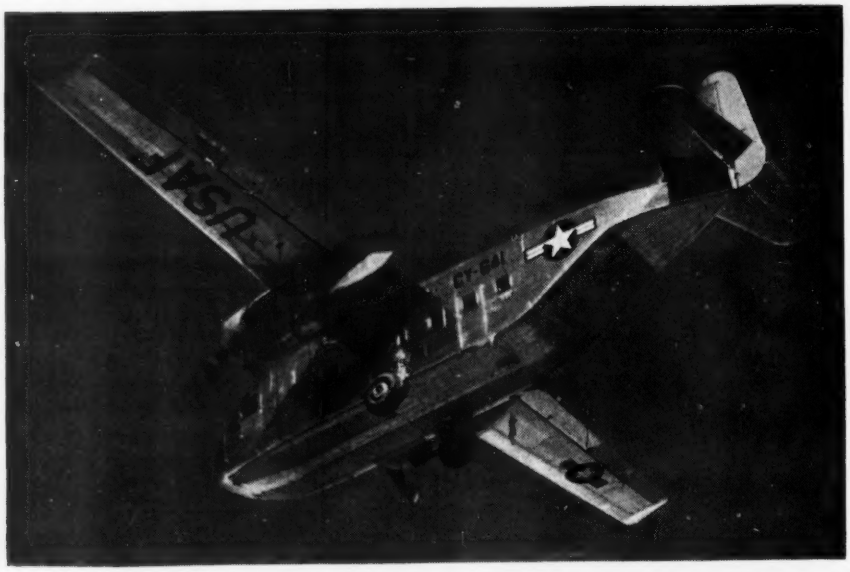
Civil Aeronautics Administration will ask the next session of Congress for authority to revise its procurement practices to conform to those of the Air Force and Navy.

At present CAA is limited to fixed price, open bid type of contracts. CAA will ask Congress for authority to negotiate contracts necessary to eliminate cumbersome bid methods. It will also seek permission to substitute cost plus fixed fee contracts for the present fixed price contracts. Greater flexibility in payments is also desired with authority for CAA to make payments in any manner consistent with manufacturing efficiency including advances where necessary. Elimination of excessive penalty fees on contracts not completed within specified time limits will also be asked.

▶**Seek Uniformity**—These changes are necessary to bring CAA into line with Air Force and Navy contract procedures where all three agencies are dealing with manufacturers on equipment for the joint military-civil billion dollar all-weather airways program. Manufacturers now feel they are at a disadvantage in dealing with CAA on a fixed price, open bid basis and prefer to handle military contracts for the same type equipment CAA is seeking.

Example of that was Gilfillan Bros. recent refusal to bid on a CAA order for 20 precision beam radar sets and 30 search radars, an estimated $4,500,000 worth of business. S. W. Gilfillan, head of the firm, said due to rapidly rising material and labor costs it was impossible to offer a sound bid now on work that would be delivered two or three years hence.

▶**Bendix Bid**—In the last CAA radar bids only Bendix Radio division of Baltimore submitted a bid on precision beam radar. Only three bids for search radar were received. Search bidders were General Electric, Bendix and Federal Telephone and Radio Corp. Bendix bid $2,231,800 on 20 precision beam radars and $561,629 for one set. General Electric bid $665,529 on a single search radar and $1,995,298 on 30 sets.



Chase Tests New Cargo Plane

TRENTON—The successful first flight of the versatile, new YC-122 Air Force assault transport possibly could catapult comparatively small Chase Aircraft Co. into a leading position as a manufacturer of cargo planes.

Actually a Chase CG-18A glider with two R-2000 engines, this medium-sized cargo plane is the company's first venture in powered aircraft. Since 1944 Chase has been building experimental all-metal troop-carrying gliders for USAF. It now has contracts for several CG-18A, the larger CG-20, and the C-123 (powered version of the CG-20). Present contract for the C-122 covers two planes. The company hopes its Air Force work will be the springboard for later commercial business.

After two hours of test flying over Mercer Airport here, E. J. Clinton, pilot, and W. F. Sauers, Chase executive engineer who acted as copilot, rated the performance as all that could be desired. According to Sauers, at 5000 ft. indicated cruise was 198 mph. at 2000 rpm. and 30 in. hg. "We stalled it at an indicated speed of 68 mph. Initial rate of climb was 2000 fpm."

► **Loading Ease**—Prior to the flight, spectators witnessed a combat loading and unloading operation which displayed the advantages of the YC-122's large, hydraulically operated loading ramp which lowers under the tail of the craft. A 1½ ton Army truck drove into the plane in much the same manner as it would enter an ordinary garage. In another operation, the plane unloaded 34 fully equipped troops in a matter of seconds. They came out three abreast.

The YC-122 is aimed at operations on rugged terrain which require short take-offs and landings. Its primary tactical use will be the transport of combat and engineering equipment for airborne assault troops, particularly into unprepared fields in forward combat areas. It can also be used for evacuation of wounded and to carry paratroops.

Power is supplied by two Pratt & Whitney R-2000 engines rated at 1100 hp. each, turning 12 ft.-diameter Curtiss Electric reversible props.

Other specifications:

Span	86 ft. 4 in.
Length	56 ft. 7 in.
Cargo Compartment	
Length	27 ft. 6 in.
Width	7 ft. 8 in.
Height	6 ft. 6 in.
Gross weight	29,000 lb.
Empty weight	17,000 lb.
Useful load	12,000 lb.
Take-off over 50' obstacle (no cargo and 50 percent fuel)	820 ft.
Landing over 50' obstacle (design gross weight with deceleration devices)	622 ft.
Rate of climb at sea level with normal rated power	1300 ft/min.
Service ceiling at normal rated power	25,000 ft.
Cruising speed at sea level	200 mph.
High speed	250 mph.
Range with maximum cargo at optimum cruising speed at sea level	1000 mi.

Slope Line System Favored for Funds

A move is under way to spend funds allocated for high intensity lighting equipment in fiscal 1949 for the Civil Aeronautics Administration slope line system without making a change in the military-civil approach light standards set last year.

This proposal was approved early in November by the Airport Lighting Evaluation Panel at a meeting at Landing Aids Experimental Station, Arcata, Calif. It will be submitted for final approval to the Air Force-Navy-Civil subcommittee of the Munitions Board of aviation ground and seadrome visual aids. It is this subcommittee that sets the approach light standards.

► **CAA Funds**—CAA has funds to buy 10 sets of high intensity lights in fiscal 1949. Bids for this equipment were scheduled to be opened in mid-November but may be postponed until the ANC subcommittee has a chance to act on the new proposal.

Last year CAA purchased two sets of AGA high intensity approach lights in conformity with the ABC standard set last year. This calls for a double row of lights extending 3000 ft. from each side of the runway with the left row red and the right row yellow. Only the left row was to be installed at civil fields. The slope line system consists of 10 sealed beam aircraft landing lights mounted on a frame and set at an angle of 45 deg. to the ground pointing toward an extended center-line of the runway. Frames on either side of the runway extension intersect to provide a visual glide-path as well as a directional alignment with the runway. The lights used are standard aircraft landing lights manufactured by General Electric Co

► **Want More Tests**—The ALEP proposed that no change in the present red-yellow parallel standard be made this year but that the slope line systems be installed at airports for further operational testing. Experiments at Arcata during the first half of the current fog season indicated that the slope line configuration was the most effective form of approach lighting.

A special group of pilots, meeting at Arcata to determine the effectiveness of test procedures used there, gave general approval to the LAES summary report 48-3 (AVIATION WEEK, Oct. 25). The pilots group agreed that the Bartow F and D systems were not usable below minimums of 200 ft. ceiling and half-mile visibility when relying entirely on lights after breaking out to contact flight conditions. AGA double row system and Sylvania flasher system were considered good down to zero ceiling and ⅛ mile visibility. Slope line system was considered usable down to zero ceiling and ⅛ mile visibility.

► **Want Flashers** — The ALEP also agreed that the identification features of the Sylvania and Westinghouse systems provide the best identification characteristics and that a flasher system should be superimposed on whatever approach configuration is finally approved as the new standard.

Biggest value of the slope line system according to the pilots reports is the intensity of the lights rather than the visual glide path it purports to provide. As a result further tests will be made with the 10-lamp lighting units of the slope line system without their angular installation. Other recommendations included concentration of lights near the end of the runway to provide more positive identification of the runway threshold.

Business to Canada Brings U. S. Comment

Expenditure of USAF money for aircraft parts obtained from Canada is provoking complaint among some American manufacturers whose plants could use that business themselves.

Their objection is to a situation which enables the growing Canadian aircraft industry to use the low Canadian labor rates as an advantage in bidding for U.S. military aircraft business, while the American competitors are committed to higher wages by wage and hour law and overtime provisions.

▶ **Varied Methods**—Only a portion of the USAF parts business obtained by Canadian plants appears in direct contracts, with additional business coming from U.S. firms who have maintenance contracts on military aircraft and who buy replacement parts in Canada.

Principal Canadian beneficiary is reported to be Canadair, Ltd. at Montreal. Representatives of Canadair are frequent visitors at Air Materiel Command headquarters, Wright Field, in search of Air Force business. Within the last few weeks Canadair is reported to have received the latest in a series of parts contracts for approximately $500,000 worth of C-47 parts for use in military planes.

▶ **C-47 Parts**—Canadair obtained a large stock of C-47 parts and tooling purchased in surplus from the Oklahoma City Douglas C-47 plant when that was closed at war's end. The Canadian company also made large scale purchases at the surplus sales of the Chicago Douglas C-54 plant.

Efforts of the Canadian company to sell an aircraft maintenance contract to the USAF to overhaul U.S. military planes in Canada met with violent protests from large American Aircraft maintenance operators and from U.S. labor groups who protested the labor rate differential. The result was "no sale" for the Canadian firm on the maintenance contracts.

▶ **Labor Differential**—Original manufacture of the planes for which Canadair is supplying parts—Douglas Aircraft Co. is the American manufacturer principally affected in the aircraft parts contracts.

Analysis of the labor market differential situation indicates two alternative solutions. Either USAF takes some action in its contracting relationships which will eliminate this competitive angle, or American manufacturers will probably seek to establish plants in the other countries which have the lower labor rates.

Douglas' 1947 financial reports shows the company made approximately one quarter of its commercial income from parts contracts which netted a total of more than $24,000,000.

Kitty Hawk In Museum

A big Navy truck trundled up in front of the Smithsonian Institution in Washington last week to deliver the Wright Brothers 1903 Kitty Hawk plane, first powerplane to fly. The plane was packed in three crates and will be assembled for exhibition in the first place of honor at the National Museum in Washington, after its unveiling Dec. 17 on the 45th anniversary of the first flights.

A Coast Guard helicopter, symbolizing the aid of the Kitty Hawk, N. C., Coast Guard station to the Wright Brothers, and Air Force, Navy and Army bands, participated in a brief ceremony when the plane was received by Smithsonian officials.

It had come to Washington from Brooklyn where the truck had received it from a Navy carrier. The carrier had brought it from Halifax, N. S., where it had been landed by the Mauretania after its voyage from London.

Wright Field Pioneer Dies

Brig. Gen. William E. Gillmore, former assistant chief of the Air Corps in charge of procurement who directed the establishment of Wright Field, Dayton, Ohio, died recently at Walter Reed Hospital in Washington at the age of 71. After retirement in 1930, Gen. Gillmore sought to return to active duty in World War II. He was asked to remain in civilian status as aviation consultant to Briggs Manufacturing Co., Detroit, which had large aircraft component contracts, and received official commendation for his services at war's end.

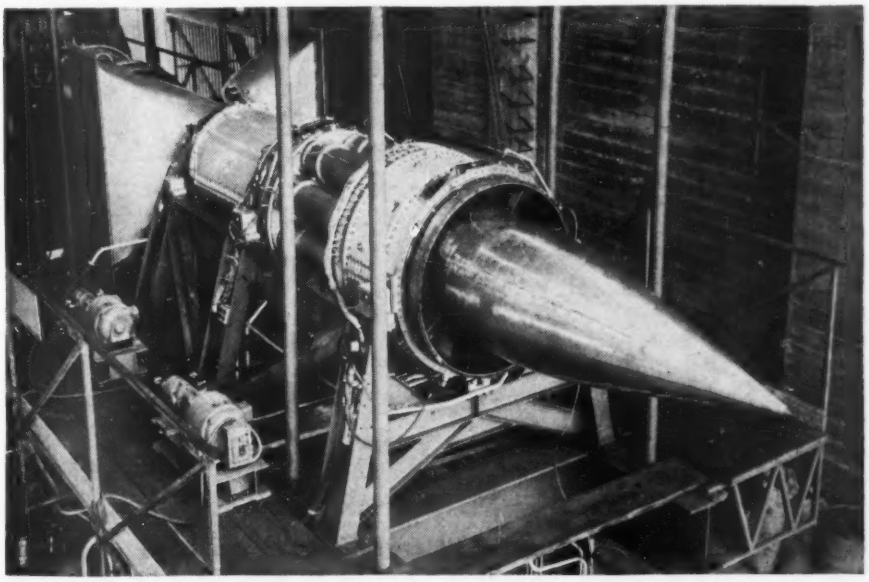
Gen. Gillmore directed initial construction and later expansion of facilities at the Wright Field Air Corps Test and Development Center, and supervised transfer of activities from the earlier center at old McCook Field. He was graduated from U. S. Military Academy in 1900, transferred to the Army Air Service in 1917, and won his pilot's rating in 1920.

A son, Brig. Gen. William N. Gillmore, artillery commander in the 11th Airborne division, flew from his Japanese station to Washington for the funeral.

New Laboratory Site

Airborne Instrument Laboratory will build an all-new $250,000 research laboratory at Plainview, Long Island, nine miles east of the present AIL setup at Mineola. Purchase of a 72-acre tract was to be completed next week. Zoning clearance has already been obtained.

The new research layout will have at least five buildings including a two-story brick administration building and a number of small research buildings. Clearing of the land will start as soon as the purchase transaction is completed, and construction will follow. Current small manufacturing projects of AIL will continue at the present Mineola location, which will be retained until the new research plant is ready.



WORLD'S MOST POWERFUL TURBOPROP

First photo of Northrop Turbodyne II reveals huge size, multiple gas turbine stages and large number of compressor stages in the new turboprop engine. Turbodyne II develops 10,000 hp., the most powerful aircraft engine in the entire world. Tailcone is enclosed in aircraft tailpipe to produce jet thrust in addition to propeller shaft power. Developed under Air Force contract, the new engine is far too powerful to permit use in existing airframes and static tests will be used until a flying test-bed can be developed, possibly the nose of a Boeing B-29 bomber.

ADMA Hears Plea To 'Educate' Military

CLEVELAND—Frank appeal to the aviation industry to "educate" the military services on revised procurement procedures, coupled with frank criticism of some existing specifications and tests on equipment, was laid before the Aviation Distributors and Manufacturers Assn. at its closing session in Cleveland by Lt. Col. J. R. Martin, chief, research and material section, procurement division, Air Materiel Command headquarters, Dayton.

Citing requirements for rocket engines for guided missiles as an example of needed correction, Col. Martin said that the Air Force currently requires a 10 hr. endurance run on a motor which will operate only 2½ min. in actual use. In the same tests he said it is necessary to run a fuel pump for 55,000 valve operations, although in actual use in a guided missile the valve will function only twice.

As a result of such over-rigid requirements, the engines cost $45,000 apiece. An engine built to less exacting specifications and tests would be far less expensive and still could do the job, Martin indicated.

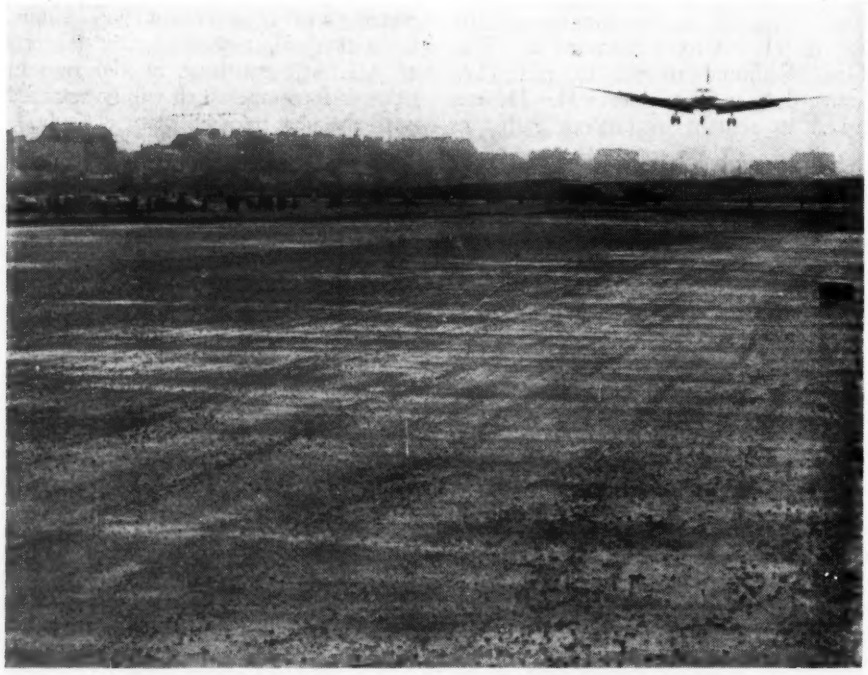
▶ **Place For Distributors**—"Make us write the specifications properly," Col. Martin asked in an appeal for the association to work with the military services in improving procurement methods. In many cases, he said, specifications did not cover distributors, yet he sees a definite place for aviation equipment distributors in supplying the Air Force, particularly in small contracts entered into by officers at local bases.

"If you don't like some of the existing regulations, its up to you to change them by working with us through your association," Martin added. "If you stand for them you don't have any right to complain."

▶ **F-87 Example**—He cited the recent contract cancellation on the Curtiss F-87 night fighter as an example of how quickly requirements had to change sometimes, with resulting dislocations all down the line on supply tables and accessory and parts requirements.

"The F-87 has a very bad habit of stalling out in the pattern," Colonel Martin said. "We were only getting five groups of night fighters, but suddenly the requirements change and the 5 groups has been increased to 16."

He indicated that "education" is needed since requirements are often prescribed by operational officers without manufacturing or procurement experience.



NEW LANDING STRIP OPENS FOR AIRLIFT

First plane landed on the new Tegel airstrip (above), in the French zone of Berlin, more than a month ahead of schedule. Strip was to be finished Dec. 15, but the C-54 touched down on Nov. 5. Last week the airlift bounced back from its bad weather headaches of earlier this month and with the aid of the Tegel strip, put down 5405 tons in one 24 hr. period. More assistance to keep the lift going during the winter is on way to the airlift team. Westinghouse Electric disclosed an Air Force order for 42 Krypton flasher approach lights, six each to be installed at the seven fields used in the Berlin airlift. And 20 more C-54s are on the way to Europe. Present equipment is 175 planes in operation and 55 more in overhaul or in transit to and from overhaul.

Air Force Revises Home Defense Setup

U. S. Air Force has begun a sweeping reorganization of its air defense components to provide more effective air defense of the continental United States and increase the efficiency of reserve and national guard units.

Toward this end USAF Chief of Staff, Gen. Hoyt S. Vandenberg created a new headquarters to be known as the Continental Air Command which will be superimposed over Tactical Air Command, Air Defense Command and the six regional air forces now in the United States.

Continental Air Command will have headquarters at Mitchel Field, N. Y., and be commanded by Lt. Gen. George E. Stratemeyer, formerly head of the Air Defense Command. Maj. Gen. Gordon P. Saville will succeed Stratemeyer as head of Air Defense Command while Maj. Gen. Robert M. Lee will command Tactical Air Command, succeeding Lt. Gen. Elwood R. (Pete) Quesada, who recently became special assistant to Vandenberg for reserve and national guard training.

▶ **New Bases**—Under the reorganization, Tactical Air Command and Air Defense Command will be little more than headquarters with Continental Air Command assigning units of the regional air forces to either command for tactical operations. The regional air forces will be relocated to coincide with Army areas.

Shifts under this plan will be:

- **14th Air Force** headquarters from Orlando, Fla., to Langley Field, Va.
- **12th Air Force** headquarters from March Field, Calif., to San Antonio, Texas.

No changes will be made in location of the 1st, 4th, 9th, and 10th Air Force headquarters.

Dick Kirschbaum Dies

Richard W. Kirschbaum, aviation writer of the Newark (N. J.) News, died of heart disease in a Newark hospital at the age of 54. He had been ill since stricken while covering the National Aviation Clinic in Detroit.

A pioneer aviation writer, Dick Kirschbaum was one of the founders of the Aviation Writers Assn. and was a vice president of the organization at the time of his death. He had been writing an aviation column in the Newark News since 1934. In aviation circles he was as well known for the cartoons he sketched at every gathering he attended as he was for his writing.

He served in the first World War with the field artillery and in World War II as a major with the Army Air Forces.

'Produceability'

AMC, industry aim at greater output potential in new aircraft designs.

DAYTON—Cooperative effort is under way by the aviation industry and the Industrial Planning division of Air Materiel Command to get greater "produceability" into new aircraft designs. It is pointing the way toward new and more efficient production techniques which promise to get more airframe pounds per dollar spent by cutting down manhours and machining operations per component produced.

Recently Air Materiel Command has agreed to rate the "produceability" of an aircraft in a contract award on an equal footing with the other items considered. Primarily, these are: tactical suitability, engineering, contractor capability and facilities, and ease of maintenance. On a point system, each of these five might be rated at 200 points for a perfect total of 1000 points in evaluating a design.

► **AMC Criteria**—Basic criteria for produceability, according to AMC's industrial planning specialists:

- Simplicity of configuration.
- Number and diversity of parts.
- Breakdown into assemblies and subassemblies.
- Ease of equipment installation, inspection and replacement.
- Availability of materials.
- Availability of machine tooling for processes to be used.
- Standardization.

Two companies which have aimed towards greater produceability in their designs are Lockheed Aircraft and Republic Aviation.

In a recent heavy bomber competition Lockheed reanalyzed its competitive design, figuring tooling, labor, skills, etc. It reported a reduction of $12 million could be made in the bid to supply experimental data and two experimental airplanes without sacrifice on delivery.

► **Thunderjet Saving**—Republic's reanalysis of its F-84 Thunderjet showed that by redesigning 21 subassemblies, 86,455 manhours could be saved per 1000 planes, and that retooling could be done economically at the level of existing orders.

By studying production headaches of World War II, experts have learned much about advantages of getting produceability into an airplane at the design stage instead of waiting to redesign after a prototype has been flown.

During World War II, aircraft availability was the vital factor. AAF and Boeing had to shelve a proposed change in the B-17 since that plane was being produced at a rate of over 500 a month. The change, while it would have meant increased production and efficiency in maintenance and parts replacement, was dropped because the planes were critically needed in the European theater.

► **AIA Assistance**—Working closely with Air Materiel Command production planners are produceability technical committees of the Aircraft Industries Assn., with Hall Hibbard of Lockheed heading the airframes group, and Ray Young of Wright Aeronautical, the engines and propellers group.

A Stanford University study of 35 different military aircraft, authorized by AMC, recommended design changes in 24. Of the changes, nine were major ones to get greater produceability.

Industrial planning division has let six contracts for redesign of some highest priority aircraft, engines and propellers for high volume production. It has allocated $6,277,916 to maintain these redesigns at a current level.

AMC also wants to estimate the effect of change to high volume production design on manufacturer tools and facilities. It has let eight contracts to aircraft makers, six to engine manufacturers and two to propeller firms for this purpose.

► **Industrial Planning**—In the middle of the produceability project is the manufacturing methods branch of AMC's industrial planning division. These specialists work with the industry and with machine tool and material sources in a quest for better and more efficient means of making military aircraft and equipment.

Typical industrial planning contracts which are part of the manufacturing methods program:

- A proposed contract to the University of Michigan for a basic evaluation of cutting tools involves study of the following processes: grinding, broaching, milling, turning and tapping, and calls for evaluation of power requirements, tool forces, tool life, tool materials, tool shapes, cutting fluids, work hardening, feeds and speeds, chip formation and clearance, coolants, temperatures, and approaching zero tolerances.

Among some of the new materials to be studied will be Gamma, Columbium, Vitallium, Timken 16, 25 and 6, Nimonic 80, Hastelloy B and C and Inconel X.

- Thompson Products has an experimental contract with Air Materiel Command for making hollow buckets for internal cooling for use in turbojets.
- Another manufacturer is working on a process to form turbine blades for a jet engine compressor out of powdered iron, so that the blades emerge virtually finished with very little additional machining necessary.
- Reynolds Metals has five contracts for developing methods of processing aluminum stock, including tapered extrusions, rolling tapered sheets, casting 32 inch ingots for forging, rolling ribbed sheet and extruding T rib skin.
- Western Products has a contract for developing a honeycomb plastic material for radomes.

► **Requests Cut**—Savings have already been realized through the manufacturing methods branch, its officials report, in cutting down requests submitted by manufacturers for additional equipment and tooling to make Air Force contracts.

Among reductions in manufacturer's requests in this category: Emerson Electric Co., $1,800,000 pared from request for additional tooling and expenditures to make fire control units; Menasco Manufacturing Co., $140,000 saved on contract to make struts; Ranger Engine division of Fairchild, $69,918 saved on subcontract to make components for General Electric.

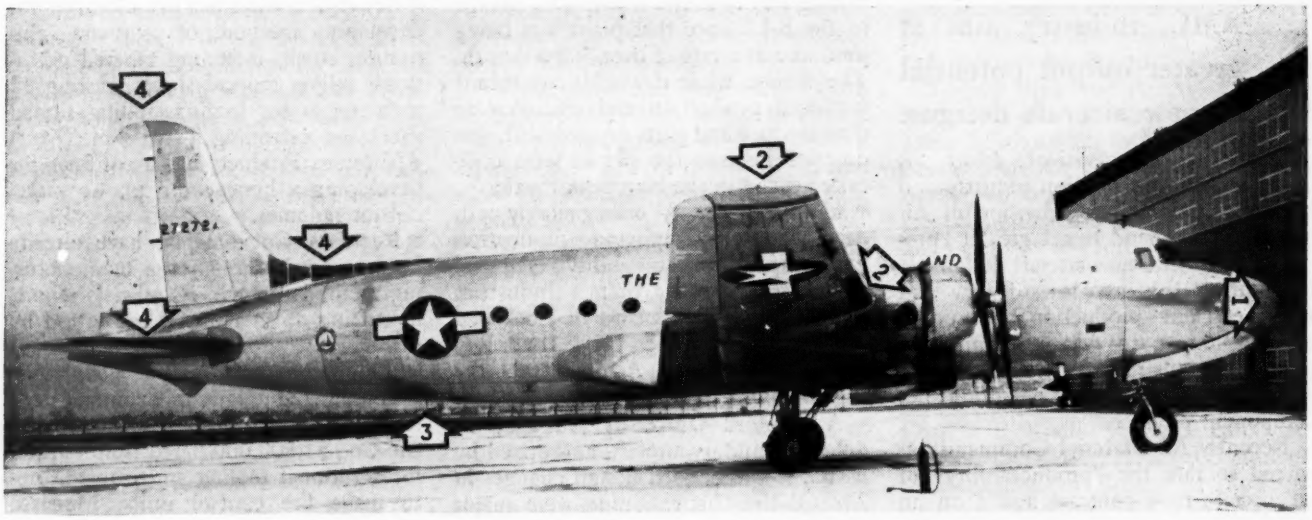
Effect of the produceability program on the aircraft industry will be cumulative. New manufacturing techniques which come into use under the spur of produceability may find applications other than in the aircraft field, and aircraft manufacturers may be able to make greater use of efficient methods and processes which have been developed in other industries.

Centralize Air Documents

Air Documents division, Intelligence Department, Air Materiel Command has been designated the Central Air Documents Office for both the Air Force and Naval Aviation by Secretary of Defense Forrestal. The new office will continue under the administration of Air Materiel Command.

Air Documents division, in addition to its translation and indexing of tons of captured enemy reports, has recently completed the cataloging of over 10,000 wartime reports of the Office of Scientific Research and Development, which produced about 85,000 reports during the war.

The division has been staffed by both Air Materiel Command and Navy Bureau of Aeronautics personnel and the new designation formalizes the relationship. A working committee, composed of an equal number of Air Force and Navy personnel, will be appointed with rotating chairmanship by designated representatives of the two departments to determine minor policies and operation.



INSIDE: Arrows indicate new locations of standard radio equipment on this ATC C-54 flying lab to permit internal antennas—1, glide path localizer; 2, liaison set antenna; 3, marker beacon receiver; and 4, radio compass loop and VHF command and homing antennas.

Drag Cut With Plastic Antenna Housings

Internal systems meet speed challenge, but interference is hitch.

By Robert McLarren

The remarkable reduction in aircraft form drag in the past twenty years has made possible attendant speed increases that have produced the 300-mph. scheduled airliner and the 600-mph. fighter.

Throughout this period, however, radio antennas have remained familiar external paraphernalia on aircraft, particularly transport planes carrying an exceptionally large variety of radio equipment. Actually, this equipment increased and became more complex during these years.

OUTSIDE: DC-3 external installations—1, intermediate frequency two-way communication; 2, ILS reception; 3, manual DF; 4, automatic DF; and 5, two sense antennas for DF.

▶**How DC-3 Was Fitted**—Typical pre-war Douglas DC-3 airliner was equipped with: (1) Inclined antenna from cockpit to top of fin for intermediate frequency two-way communication, (2) short inclined antenna from top of fin to baggage compartment for emergency radio range receiver, (3) two vertical whip antennas below cockpit to receive radio range and traffic control simultaneously, (4) exposed loop for static-free radio range reception in bad weather, (5) enclosed loop for automatic direction finding equipment, (6) two sense antennas on short, stub masts below fuselage to provide automatic orientation for the two direction finders, (7) short, balanced-T antenna below fuselage to receive VHF marker signals, (8) horizontal loop atop fuselage for instrument landing reception, and (9) one or more VHF antennas, depending on equipment carried.

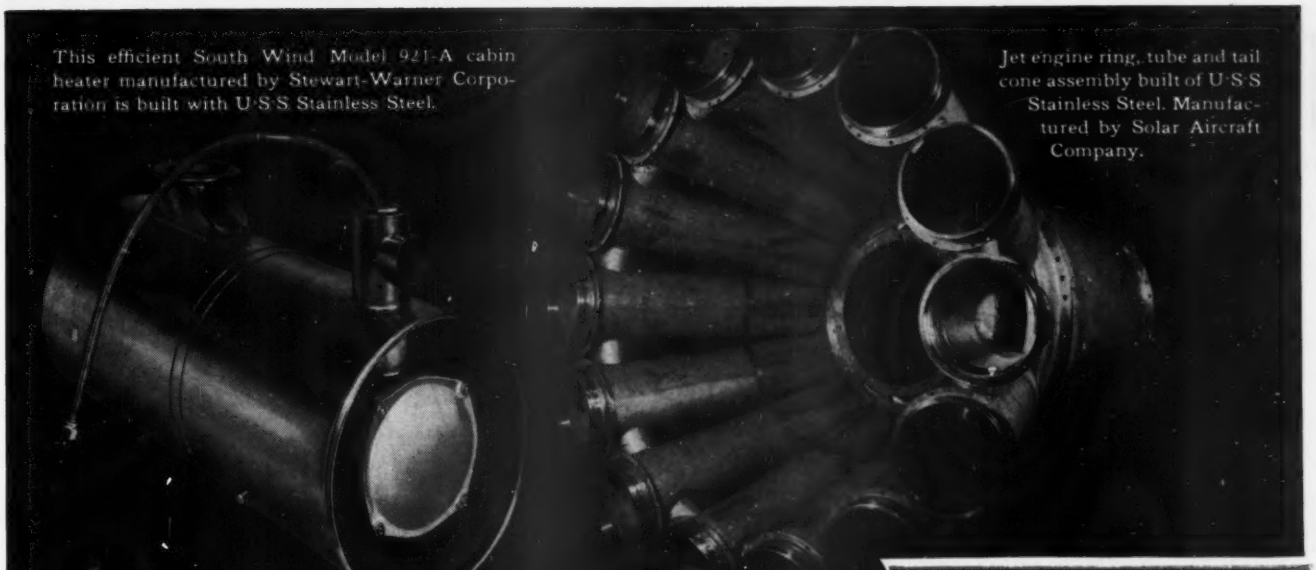
These arrays are estimated to have cut as much as 20 mph. from the cruising speed of the DC-3 of that period.

▶**Short Antennas**—One factor that acted to reduce drag was the steady shift in aircraft radio frequencies from the medium to the high and very high bands with accompanying reductions in antenna length. Very high and ultra high frequencies actually require antennas only a few inches long.

This trend made it apparent early in the war that such short antenna might be fully enclosed within the aircraft mold line, provided the problem of interference could be solved.

One of the first radio units to be

Based on a paper by F. H. Behrens, Air Materiel Command, delivered before Society of Plastics Industry, Washington, D. C., June 29-30, 1948.

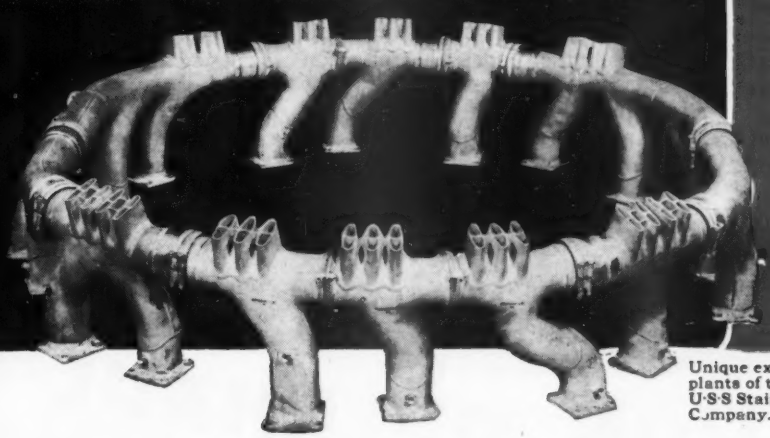


This efficient South Wind Model 921-A cabin heater manufactured by Stewart-Warner Corporation is built with U·S·S Stainless Steel.

Jet engine ring, tube and tail cone assembly built of U·S·S Stainless Steel. Manufactured by Solar Aircraft Company.

FOR IMPORTANT PARTS LIKE THESE

—it pays to use U·S·S Stainless!



Unique exhaust system for one of the two power plants of the Lockheed P2V Neptune. Built with U·S·S Stainless Steel by the Ryan Aeronautical Company.

THREE manufacturers, well-known in the aircraft industry—Ryan, Solar and Stewart-Warner—are represented in the products shown here. All use U·S·S Stainless Steel because in this *perfected*, service-tested steel they are insured a consistent uniformity of composition, finish and fabricating qualities that allows them the widest latitude in design and permits them to employ the most advanced manufacturing techniques.

U·S·S Stainless Steel admirably meets the stringent requirements for airframe and engine parts that must have not only high resistance to corrosion, oxidation and cavitation but must maintain these properties at extremely high temperatures for many hours at a stretch. It lends itself readily to intricate forming, to gas, arc and resistance welding and other fabricating processes.

To help you apply U·S·S Stainless Steel to insure optimum results both in its fabrication and in its performance, we offer you the practical cooperation of our engineers. They will gladly show you how to realize the fullest advantage from its use.

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8-366

UNITED STATES STEEL AMERICAN STEEL & WIRE COMPANY, Cleveland, Chicago & New York
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NATIONAL TUBE COMPANY, Pittsburgh · TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham
UNITED STATES STEEL SUPPLY COMPANY, Warehouse Distributors—Coast to coast: UNITED STATES STEEL EXPORT COMPANY, New York

fully enclosed was the direction finder loop antenna, which was put in a housing in the early '30s, principally to provide an electrostatic shielding assembly to protect the loop from the static charge on dust, rain, snow, etc.

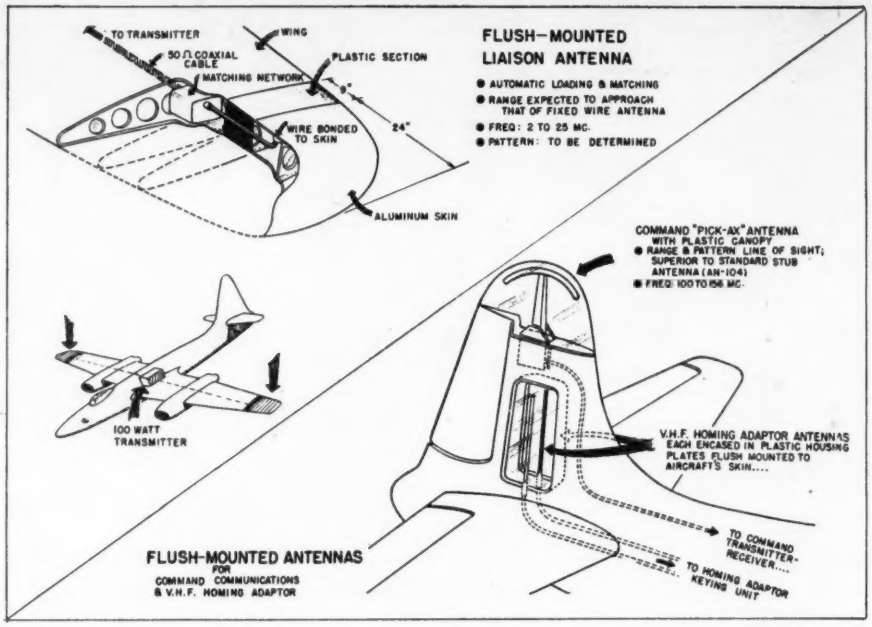
However, this housing was molded in a streamlined form to cut the drag, which was reduced as much as 60 percent in some cases.

▶ **Joint Research**—Introduction of radar early in the war brought the problem of placing the early ASV dish spinner unit in a non-conducting, streamlined enclosure, and much of the subsequent research on antenna housings has been an outgrowth of this original problem.

For more than five years this has comprised a joint research program of the Air Materiel Command, Naval Air Development Station, Massachusetts Institute of Technology's radiation laboratory and numerous industrial research and development contractors.

How well this program has succeeded is evidenced by the fully enclosed antenna installations in these craft—Lockheed F-80, Republic F-84, North American F-86, Curtiss XF-87, McDonnell XF-88, Northrop XF-89 and the special Douglas C-54 modified by Goodyear Aircraft Corp. into an enclosed antenna research airplane.

These aircraft feature installations of instrument-approach and radio-compass antennas within the canopies and radar altimeter, radar beacon and search radar antennas within the fuselage.


TO TRANSMITTER
WING
50 Ω COAXIAL CABLE
PLASTIC SECTION
MATCHING NETWORK
WIRE BONDED TO SKIN
24"
ALUMINUM SKIN
FLUSH-MOUNTED LIAISON ANTENNA
● AUTOMATIC LOADING & MATCHING
● RANGE EXPECTED TO APPROACH THAT OF FIXED WIRE ANTENNA
● FREQ: 2 TO 25 MC.
● PATTERN: TO BE DETERMINED
COMMAND "PICK-AX" ANTENNA WITH PLASTIC CANOPY
● RANGE & PATTERN LINE OF SIGHT; SUPERIOR TO STANDARD STUB ANTENNA (AN-104)
● FREQ: 100 TO 156 MC.
100 WATT TRANSMITTER
V.H.F. HOMING ADAPTOR ANTENNAS EACH ENCASED IN PLASTIC HOUSING PLATES FLUSH MOUNTED TO AIRCRAFT'S SKIN....
TO COMMAND TRANSMITTER-RECEIVER....
TO HOMING ADAPTOR KEYING UNIT
FLUSH-MOUNTED ANTENNAS FOR COMMAND COMMUNICATIONS & V.H.F. HOMING ADAPTOR

▶ **Difficulties Involved**—Principal problem of the plastic antenna housing is the elimination of undesirable reflection and interference.

The housing, at best, absorbs appreciable amounts of radiated power and introduces distortions of the radiated field through reflection, refraction, diffraction and other difficulties comparable to those of light passing through windows.

At worst, the housing can reflect sufficient energy back into the antenna to create signal instability in the equipment.

The conflict between reflection and aerodynamic drag is not an easy one to

solve since research has revealed that there are critical incidence angle limitations below which the enclosure will reflect radiations back into the antenna. Hence, the enclosure cannot be streamlined beyond the limitations of these critical angles.

It is this basic conflict that has created the complex design problems in the antenna enclosure field.

▶ **Thickness Factor**—Whereas the shift from medium to very high frequencies has aided the shortening of exposed antennas, it has worked in reverse in the radar field.

In the former, the wave lengths are so long that the thickness of the enclosure is a negligibly small fraction thereof and very little reflection difficulty arises.

With the extension of radar into the microwave field, in which the wave length is only a few centimeters, thickness of the antenna enclosure becomes a very appreciable fraction of the radiated wave length. Reflected energy from the outer and inner faces of the enclosure are no longer in proper phase relationship to insure minimum net reflection of the incident energy.

In addition, the principle advantage of microwaves is their ability to propagate in straight lines and bending or refraction in the enclosure must be held to an absolute minimum.

▶ **Design Approach**—One of the solutions to this problem is the use of low-pressure laminates formed into a sandwich of two thin skins separated and fully stabilized by a controlled thickness of low-density core material bonded between them. This accomplishes the desired neutralization of unwanted reflections and simultaneously provides a great increase in strength for a given weight over that realized in single-wall designs.

It is this high-strength characteristic that makes the sandwich-type enclosure promising for transonic and supersonic aircraft.

Some of the major problems in the design and fabrication of antenna enclosures are:

Provision of adequate streamlining.

Achievement of sufficient electrical transmission efficiency.

Limitation of beam distortion and deflection to usable tolerances.

Development of strong, lightweight materials, also suitable for elevated temperatures.

Realization of satisfactory serviceability, particularly when subjected to rain and hail erosion.

▶ **Streamlining**—The relative orientation of the projected rays and the sloping surface of the enclosure at the piercing points determine the critical incidence angles previously mentioned. Upper limiting values to which the angle of incidence may be extended is a function of the dielectric properties of the materials, and the lower the value of the dielectric constant the greater the allowable angle of incidence.

This relationship pointed towards proper adjustment of the enclosure thickness as a solution to the problem. Subsequent experience proved the desirability of providing a suitable gradation of the enclosure wall thickness to suit the incidence angle conditions encountered throughout the enclosure.

Variations in wall thickness, however, present fabrication difficulties which require the development of special molding techniques.

▶ **Transmission Efficiency**—It is apparent that an accurate analysis of ray incidence conditions is needed, the extent of the analysis required varying directly with the degree of enclosure streamlining desired.

Methods have been developed for conducting complete studies of ray incidence conditions with a considerable degree of accuracy. These studies provide all needed data on the incidence angles and relative polarization directions encountered throughout the enclosure, thereby providing design information for proper grading of wall thickness.

However, the designer can take advan-

(*Continued on page 24*)

AIRLINES AND AIRFORCES ★ ★ ★

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Without objects in background for size comparison, these views of free-flight 1/10th-scale model—experiment for a

How Flying Boat Scale Models Pre-Pro

A precision pre-test program utilizing a radio-controlled, 1/10 scale model has furnished Consolidated Vultee Aircraft Corp. with invaluable information on how its new experimental flying boat, the XP5Y-1, will perform—both on the water and in the air.

This type of advance proving is intended to insure elimination of expensive and hazardous difficulties which might normally be encountered with trials of an actual aircraft.

▶ **Scale Details**—Except for leading edge wing slots which were necessary to give full scale lift characteristics, the model is a geometric duplicate of the full size craft. In addition, weights, performance, and dynamic forces acting on the model are also to scale.

The accompanying photos show models in which the technique has been applied—the XP5Y-1, XP4Y-1 (full scale craft wasn't built) and a model which represents no specific flying boat. Also pictured is a method of rigging a model for an aerodynamic test-setup.

▶ **Model Makeup**—Model wing and hull feature balsa monocoque construction, affording a higher strength-weight ratio than in the full size plane. Additional weight saving is effected with Metl-bonding the wing spars.

Tail surfaces are silk-covered, conventional ribbed structures.

Adjustable pitch propellers are machined from 24ST dural.

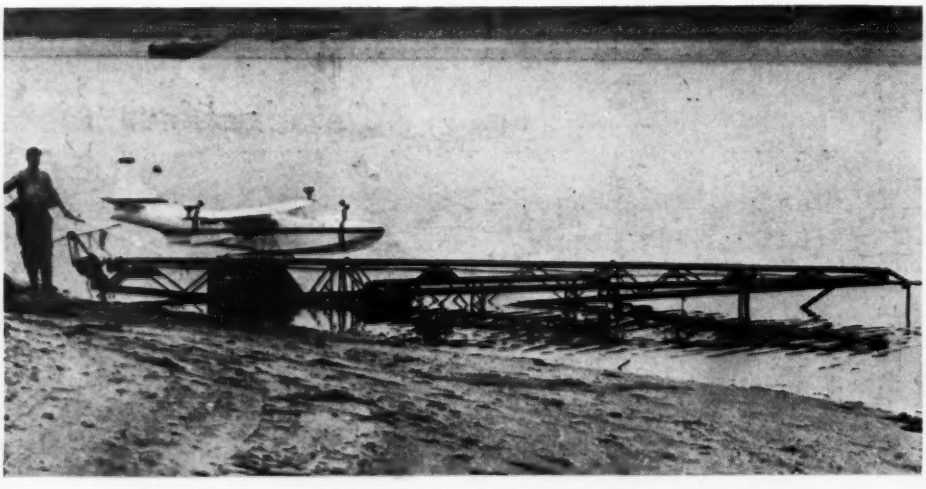
Weight of the assembled model is 90 lb. Radio control system weighs 20 lb.

Powerplant installation comprises four 2-hp. engines.

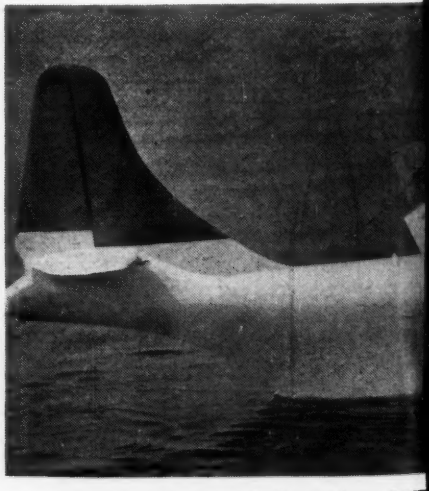
▶ **Radio Action**—Radio controls can handle the model up to distances of 3000 ft. Engine throttles can be controlled by radio or shut off completely.

If the craft assumes an unfavorable attitude, controls automatically revert to a predetermined position when the carrier signal is cut.

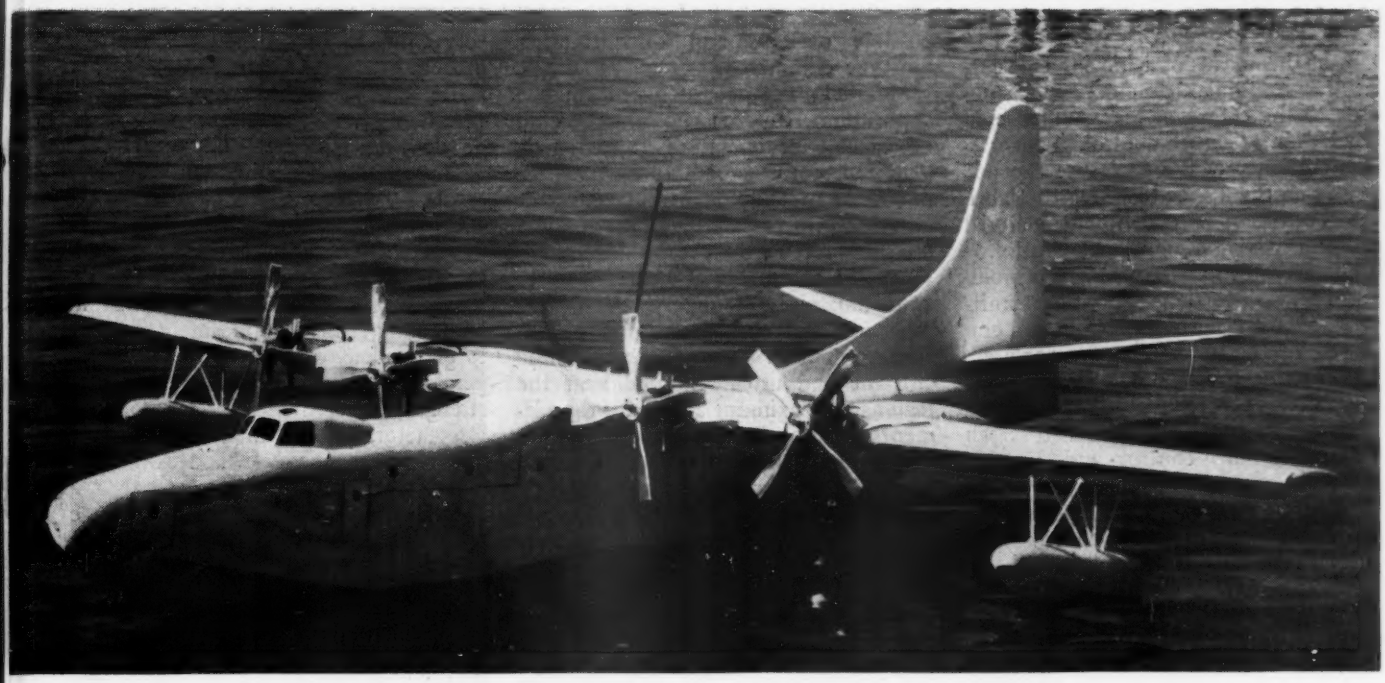
Should the model fly beyond the range of the transmitter, the signal's



Minus engines, a model of XP5Y-1 is readied for catapult launching.



Scale version of XP prepa



nent for advance testing—present strikingly realistic impression of Consolidated Vultee Aircraft Corp.'s new XP5Y-1.

-Rove Design

Convair's radio controlled miniatures afford data disclosing how actual craft will behave.

maximum amplitude will reduce gradually, and the model will execute a gradual left turn and come back into range.

With the 3000-ft. range of the radio, center of gravity limits of hydrodynamic stability are readily obtained. Landing characteristics may be observed with variations of trim and sinking speed. Seaworthiness may be determined for various degrees of wind and sea conditions.

▶**Camera Used**—The model is fitted with a 16-mm. camera, trim and speed indicators, sweep second timer, accelerometers and electric contacts which give a time history of step, bow, and sternpost contact with the water.

Camera is interconnected with starboard throttle and is operated at will to permit flight records of takeoffs and landings.

▶**Aerodynamic Tests** — For measuring aerodynamic forces, an automobile was rigged with a detachable truss supporting a roller cage, with a model mounted on a yoke fastened to the cage. Strain gages on the yoke measure forces on the model.

Simultaneous readings of the gages and a sensitive low-speed airspeed indicator permitted six component aerodynamic data to be computed readily.

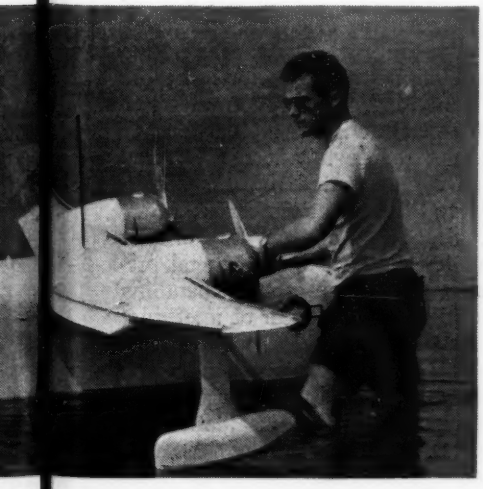
Comparison with wind tunnel results disclosed good agreement of lift, moment and control effectiveness.

▶**Research Potential**—Convair has also constructed models without engines, launched them from a catapult to obtain data on landing characteristics.

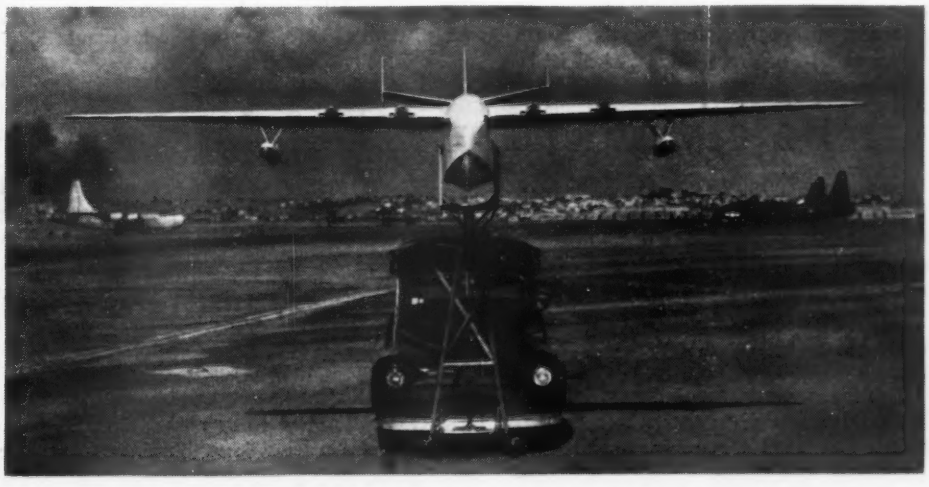
In addition to stability criteria, Convair's technique is adaptable to all phases of hydrodynamic research—on hydrofoils, hull forms, auxiliary sustention and high lift devices.

How existing flying boats are affected by modifications can also be determined quickly.

And time from conception of an original design to its production stage can be effectively reduced.



f XP prepared for trials.



This flying boat model is rigged atop auto for aerodynamic testing.

Antenna (*Cont'd. from p. 21*)

tage of this means of achieving efficient, highly-streamlined antenna enclosures only to the extent of his confidence in fabrication tolerance control. Transmission efficiency of the enclosure depends largely on the degree to which the fabricator can achieve constituent material uniformity and dimensional control.

► **Beam Distortion**—Importance of holding beam distortion to critical limits varies directly with the frequency employed in the antenna to be enclosed.

Generally, these limits fall into three general classes—frequencies up through VHF and ordinary ranging radar; search radar; and fire control and homing radar. In this last class, the equipment is supersensitive to otherwise negligibly small variations in reflection from the radome, resulting in excessive beam deflections or bending errors.

Generally, the thinnest possible sandwich skin permitted by structural considerations offers the best possible chance to realize the required degree of reflection control. In addition, all possible overlaps and discontinuities must be eliminated.

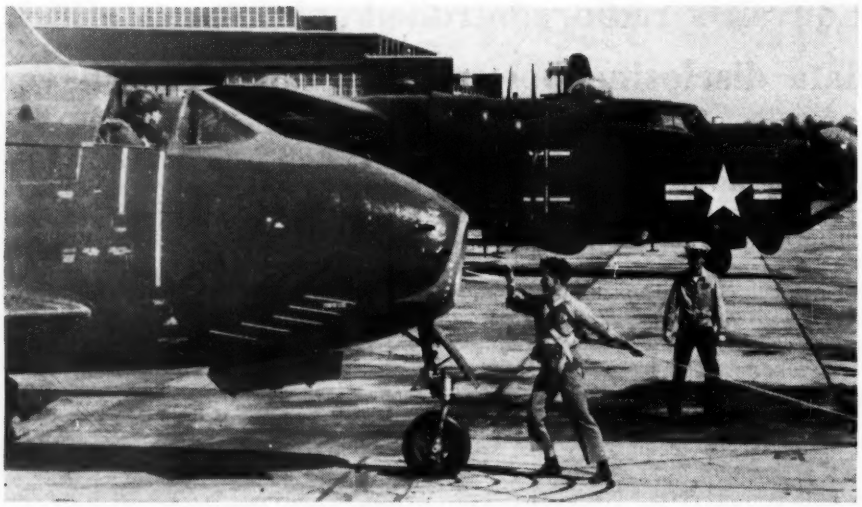
► **Elevated Temperatures**—In missile applications, antenna housings should be capable of operation at extremely high temperatures because of their exposure to the friction heating effect of high speed. In piloted aircraft, antenna housings for use in the immediate future must be capable of operation up to approximately 170 F.

► **Service Problems**—Since antenna enclosures are an external part of the airframe and usually located near the regions of maximum attack by the elements, resistance of laminated plastics to the errosive effects of high-speed flight is a major consideration.

Considerable difficulty has been experienced in the past with this problem and the solution apparently lies only in continued development of higher strength molding materials. Other service problems include development of non-degrading materials and methods for integral pigmentation of the enclosure surface to match the airplane skin; very thin, slightly conductive, surface finishes which may be used to drain off static charge without impairing the radiation performance; satisfactory anti- or de-icing materials and techniques; and methods and equipment for field repair.

► **Current Aims**—The joint research and development program in antenna enclosure design and fabrication is currently working for improvements in laminating resins to bond more strongly to glass fibers, operate at elevated temperatures, have increased physical strength, lower dielectric constant and loss factor, possess moderate viscosity for void-free lamination and exhibit reduced moisture absorption.

Other improvements sought include adaptability of sandwich core materials to fabrication in graded thicknesses, uniformity of physical and electrical properties, lower density, compatibility with laminating resins, resistance to impact shock, and adaptability for fabrication to close tolerances.



How near a person can safely approach a jet aircraft intake has been the subject of Navy experimentation at Patuxent River, Md., where Lt. A. L. Hall, shown above, approached within two feet of the North American FJ-1 without being sucked in by the powerful draft. Question has been matter of speculation ever since a mechanic was killed a year ago at Muroc, Calif., when he was sucked into intake. Hall reported that at a little more than two feet distant the air velocity was about 38 knots.

Turbojet Safety Rules Emphasized

Introduction of the turbojet engine into the aircraft field has brought with it new problems of safety for test and servicing personnel.

Some of these new rules were outlined by Richard Wilkins, chief safety engineer, North American Aviation, Inc., in a paper presented at the 36th National Safety Congress, Chicago.

► **Cell Details**—High engine speeds and abnormal operating conditions common to jet engine static testing require specially-designed test cell buildings with 1-ft.-thick concrete walls or 3-in. steel barriers to absorb damage caused by engine structural failure.

In areas adjacent to the compressor and turbine assemblies, including a 15-deg. angle either side of the plane of these units, concrete walls should be 2 ft. thick, steel walls at least 6 in.

Observer windows should not lie in these areas, but if required should not be larger than 6 in. wide by 2 ft. long and incorporate at least ¼-in. bullet-proof glass.

In addition, explosion hatches should be provided—at least 1 sq. ft. in area for each 25 cu. ft. of test cell volume.

Engine air inlets should not be closer than three or four diameters to test cell walls to avoid turbulence, should be located high enough from the floor to prevent entry of dirt, and screened to keep out paper, rags or other objects.

► **Cell Test Precautions**—Where cells are provided with doors, locks should be wired as contacts in such manner that ignition and starting power cannot be applied until the locks are closed.

General precautions to be observed in cell testing include: Pre-start check of engine for loose fittings; pre-start cranking of engine to starting speed with ignition off to check fuel and oil leaks, closing of stopcock and unusual noise; clearing of personnel from test cell before start; starting of engine and idling for 2 min. to observe leaks; accelerating and holding at top speed for not more than 5 min.; insuring that allowable tailpipe temperature is not exceeded; make recordings; reduce to idle speed slowly and have crew enter cell for adjustments; and then shut engine down.

► **In Ground Test**—In an aircraft ground test, observe these general precautions: Use usual care in handling jet fuel; always stand clear of inlet duct by at least 12 ft.; stand clear of exhaust blast by 100 to 150 ft.; when engine is shut down avoid burns caused by contacting the tailpipe installation before it has cooled.

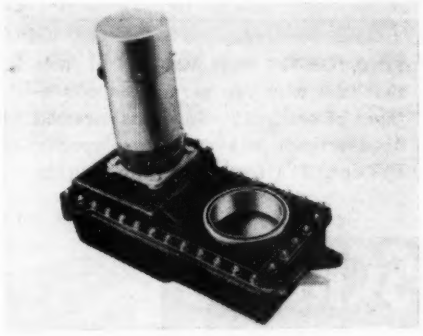
Ear plugs must be worn at all times engine is running.

NEW AVIATION PRODUCTS

Lightweight Ladders

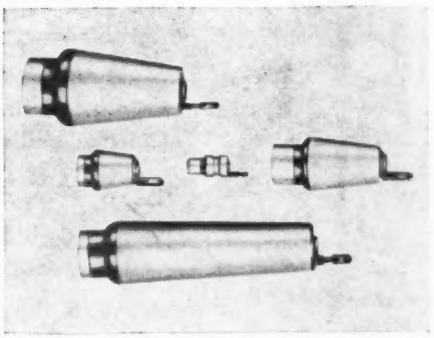
Magnesium refueling-ladder made by **Magnesium Products Corp.**, 150 Broadway, New York 7, N. Y., affords strength comparable to mild steel and is reported to be 35 percent lighter than aluminum. Extension is from 10 to over 16 ft., weight 29 lb. Siderails are 3-in. I-beams with rungs welded through. Curved top is padded with rubber gunwale guard to protect leading edge. Feet have rubber safety shoes or are spiked, as desired.

Company's aircraft repair, two-sided step ladder (not shown), available in heights of 4, 6, 8 and 10 ft., is built to take 1000 lb. on each side. Construction is welded magnesium, weight is 3 lb. per ft. Platform top is 9 in. Pads are welded on feet, enabling use on gratings and repair docks.



For Aircraft Air Valving

New air valve, designed specifically for use on turbojets to modulate air flow as well as serve as an on-off valve in cabin air conditioning system or wing and empennage anti-icing system, is offered by **Industrial Design Laboratories**, 12120 Wagner St., Culver City, Calif. Operating advantages are stated to include good seal in any position (leakage rate of less than 0.15 lb./min.), low actuating torque requirement of less than 200 lb.-in., long life because of no sliding friction, and double-duty service either as modulator to control air flow or as shut-off valve. Unit has pressure range from 0 to 140 psi. gage, and temperature range of −65 to 500 F. Electric actuator conforms to AN-M-10a specifications. Power consumption is ½-1 amp. at 24-28v. d.c. Time from closed to open position is 20 to 25 sec. Port diameter is 3½ in. Weight of device is 14¾ lb.



Hermetic-Seal Terminals

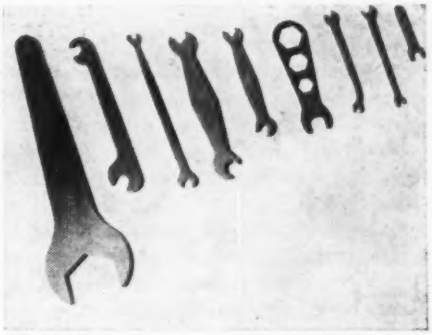
Sealed terminal for use on metal enclosures—transformer, condenser and relay cams, etc., is made of glazed steatite claimed not to crack under rough handling and to be immune to thermal shock. Tinned surface, permanently bonded to steatite body, permits easy soldering to enclosure after insertion in proper size hole. Leads are brought through opening running axially through bushing and soldered to tinned lug provided at end of bushing. Maker is **General Ceramics & Steatite Corp.**, Keasbey, N. J.

New Thermal Switch

Weighing only 1.4 oz. and steplessly adjustable for temperature within −75 to 1250 F., switch made by **Airite Products Co.**, Union Pacific Ave., Los Angeles 23, Calif., is designed primarily for fire detection but can be used for cycling control of cabin heating systems and handling of oil and refrigeration installations. Feature is "frictionless and non-wearing" pivot to assure accuracy and dependability. High temperature magnet is used to quench arcing and compound its force with that of pivot to provide fast, positive action. Stainless steel housing is hermetically-sealed. Unit can be changed from normally-open to normally-closed by quick replacement of electrical terminal.

Airport Guardian

New fire truck designed and built by **Ansul Chemical Co.**, Marinette, Wis., uses dry chemical as primary extinguishing agent. Capacity is 2800 lb. of chemical, 250 gal. of water. Fully loaded, vehicle weighs 21,500 lb., has four wheel drive, five forward speeds and one reverse. Maximum governed speed is 62 mph., but governor can be removed for higher speed. Four extra compartments on side house accessory fire and rescue equipment.



Custom Made Wrenches

Special die-cut wrenches in small quantities are offered by **Dayton Rogers Mfg. Co.**, Minneapolis 7, Minn. Products are particularly adaptable to special equipment where one or more special wrenches are required to be shipped with each piece of apparatus. Wrenches may be procured from smallest size up to maximum length of 20 in. in gage thickness of $\frac{3}{32}$ to ¼ in. Units can be produced from any sheet stock, heat treated and finished to customer's requirements, and are reported to cost considerably less than regular forged construction.

Only PHILLIPS RECESSED HEAD SCREWS have driver sizes engineered in BALANCE with ALL screw sizes . . .

OF ALL SCREW SIZES used in industry, the percentages shown are driven with each of the four driver sizes.

ONE DRIVER SIZE is adequate for the great majority of assemblies—No. 2.

FOR SMALLER OR LARGER SCREWS you want a driver proportioned to the screw to prevent overdriving or underdriving . . . for the same reasons that you use a tack hammer for tacks or a sledge hammer for spikes.

DRIVERS SHOWN ⅛ SIZE . . . RECESSES ACTUAL SIZE

Exhaustive tests in the development of Phillips Screws proved four recess sizes the minimum to assure adequate strength in all head sizes.

Practical Production Assembly *requires*

CONTROLLED DRIVING POWER MATCHED to the SCREW SIZE

Assembly experts know that a driver proportioned to transfer efficiently the power necessary to drive a large, heavy duty screw could be used for smaller screws only at the risk of overdriving.

By using a driver properly proportioned to the screw size, an assembly worker needs no special skill to drive the screw easily and quickly, and seat it correctly, *without overdriving or underdriving.* Overdriving leads to stripped threads and strained screw heads—underdriving impairs assembly strength.

With the Phillips Recess, you know the driver and screw are in perfect *balance,* whatever the size. By varying the length and diameter, the same *balance* is provided in Phillips Bits for hand brace, spiral, or power driving.

To be sure of the driving efficiency and fastening security essential to *practical production driving,* ask for Phillips when you order cross recessed head screws.

SEND FOR THE NEW BOOKLET of facts that tells why you get *all* the advantages of assembly with cross recessed head screws only when you specify Phillips. It's free . . . use the coupon.

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Send me the new booklet—"How to Select Recessed Head Screws for Practical Production Driving".

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Lightplane Study Program Detailed

Distributors hear Fred Weick discuss Texas A & M personal plane research projects.

By Alexander McSurely

CLEVELAND—An airplane that will fly straight except when the pilot turns it deliberately is a research project which will be undertaken by the Texas A & M College's Personal Plane Research Center, Prof. Fred E. Weick, director of the center, disclosed to members of ADMA and NATA at a combined meeting last week.

The airplane, which presumably would have some means of compensating for varying degrees of torque at varying throttle settings, should be developed within the next few years on a basis of present engineering knowledge, Prof. Weick said.

The Ercoupe designer mentioned the straight-flying airplane as one of a number of projects which his organization at College Station, Texas, was undertaking and which, taken together, constitute an important program of technical improvement for the small business and personal airplane. Projects include:

- Research on high lift devices to produce a plane capable of using small close-in fields.
- Longitudinal and lateral control of airplanes in stalls.
- Spin recovery with controls free.
- Prevention of spin.
- Cockpit design for crash protection.

Prof. Weick cited the 90 hp. Cub as a plane with light power loading and light span loading capable of good short field takeoff. The Boeing L-15 liaison plane has shown about as good a use of high lift devices as is known now in military aircraft, he added. Much of this is applicable to personal aircraft.

▶ **Noise Reduction**—The best of the recent personal airplanes have shown marked improvement in passenger comfort, he reported. Reduction of airplane noise to an acceptable level will not require the manufacturer to go as far as the experimental quiet airplanes recently developed, he believes, but can be accomplished by muffler improvement and "some little propeller change."

Approximately half of the personal plane accident fatalities can be eliminated by making planes spinproof or equipping them with efficient stall warning devices, he added.

National Aviation Trades Association delegates meeting in Cleveland called upon their state associations to work with congressmen in each state for a clarification of the Civil Aeronautics Act of 1938, by amendment in the next session of Congress.

▶ **Act Should Cover More**—Harry Meixell, executive director, pointed out that the Act as established 10 years ago was intended mainly for regulation of scheduled airlines operating regularly over regular routes. It does not adequately cover other types of air carriers.

NATA is asking for Congressional action to:

- Establish areas of economic regulation of air carriers for federal government and state governments, with particular reference to segments of interstate carriers operating intrastate.
- Classify air carriers as common, contract and private carriers, in a new alignment paralleling classification of surface motor carriers.
- Prescribe the economic regulation to be applied to each type of carrier.

It was contended that the federal agencies are currently attempting to regulate all forms of air carrier under an act framed only for scheduled air route operation, and that many of the new regulations covering new types of carrier operations are in effect new laws not contemplated within the framework of the 1938 act.

▶ **Rentzel Report**—Administrator Delos W. Rentzel of CAA speaking at the combined meeting of the Aviation Distributors and Manufacturers Association and NATA, reported that a restudy of CAA annd CAB regulations is underway, with a plant to "reduce drastically" the great number of regulations now on the books by eliminating all found unnecessary.

The elimination program will seek to cut out all obsolete and unnecessary regulations, regulations that are merely considered good operating practice and so are superfluous, and regulations pertaining to petty items that if violated would not be worth enforcement action.

Warning against short-cutting safety measures if too great relaxation in safety regulation is made, Rentzel pointed out on the other hand that the persons who desire drastic regulations to curb "hot pilots" of airplanes, forget that there are also "hot" drivers of surface vehicles, and that regulations to curb the "hot" pilots will curtail unduly the safe pilots just as drastically.

"We do not agree with this philosophy and we will not accede to such demands for more and more regulation," he stated.

▶ **Stop Quarreling**—Robert Ramspeck, executive vice president of Air Transport Assn., called for greater cooperation between aviation agencies to serve their common interests and a cessation of quarreling between aviation interests in favor of a positive integrated program.

J. B. Hartranft, Jr., general manager of AOPA, offered facilities of his organ-

ADMA Officers

Richard N. Bomberger, vice president, sales, Sensenich Corp., Lancaster, Pa., was elected president of Aviation Distributors and Manufacturers Assn., at the recent Cleveland convention, succeeding R. B. Kenty, vice president, Air Associates Inc., Dallas.

Other officers:

Vice Presidents—G. B. Van Dusen, president, Van Dusen Aircraft Supplies, Inc., Minneapolis, and Robert W. Richardson, aviation sales manager, Goodyear Tire & Rubber Co., Akron.

Board of Directors—Terms expiring in 1949: H. L. Wheeler, vice president, Buffalo Aeronautical Corp., Buffalo, N. Y.; Charles Crawford, C. J. Hendry Co., San Francisco; A. M. Recker, aviation sales, Goodyear Tire & Rubber Co., Akron; F. W. Kreuger, Bendix Products division, Bendix Aviation Corp., South Bend. Terms expiring in 1950: Lawrence F. Zygmunt, president, General Aircraft Supply Corp., Detroit; B. J. Anthis, vice president, Air Accessories, Inc., Ft. Worth; D. H. Hollowell, vice president, sales, Continental Motors Corp., Muskegon, Mich.; James Riddle, president, National Aeronautical Corp., Ambler, Pa. Terms expiring in 1951: E. L. Crabb, vice president, S. A. Long Co., Inc., Wichita; Charles F. Irons, vice president, Snyder Aircraft Corp., Chicago; Earle M. Scott, president, Scott Aviation Corp., Lancaster, N. Y.; E. T. Syvertsen, service manager, Thompson Products, Inc., Cleveland.

Secretaries—H. Donald Richards, executive secretary, and George A. Fernley and Thomas A. Fernley, Jr., advisory secretaries, at ADMA headquarters, 808 Arch St., Philadelphia.

ization to the aviation manufacturers and distributors, in checking public demand for various items and in changes desired by the consumers represented by his group.

Al Vandenberg, Continental Motors service manager, urged the importance of service facilities at engine distribution points, and discussed plans for a new system of warehouses for engine parts to serve distributors, which is a current experimental project for his company.

► **Margins Outdated**—R. M. Durham, president of Durham Aircraft Service, Inc., Woodside, N. Y., described present margins alloted to distributors as outdated. A poll of manufacturers indicates estimates of overhead expenses to distributors in selling aviation merchandise as ranging from 11 to 28 percent while ADMA distributor members reported increase of from 24.7 to 26.1 percent in the last two years. Distributors, Durham believes, in many cases are now getting by on the high margins of profit from war surplus item sales, but this is a temporary condition which soon must be improved by readjustment of other margins.

L. W. Trees, service manager of Bendix Aviation's Scintilla Magneto division, reviewed his organization's methods for establishing distributor qualifications.

H. Donald Richards, ADMA executive secretary, reported the association currently has 91 members including 54 manufacturers and 37 distributors, the largest membership in its history. It is believed that the distributor membership is close to a levelling off point during the current status of the industry, but that there will be a number of other manufacturers who will become members in the near future.

Beverly Howard, retiring NATA president, speaking before ADMA, reported that the fixed base operator has done no selling since 1940 and that he is out of the habit. He urged the importance of selling flying in general and selling safety as opposed to bitter competitive product selling and attacking the competitor's product.

Gil Quimby of RCA, radio chairman for ADMA, reported that 20,000 planes are now equipped with radios and predicted a sizeable increase in radio markets on planes with use of VHF radio equipment and the omniranges.

New Ercoupes

Two new 1949 models of the two-place Ercoupe are being groomed for announcement and first demonstrator shipments about the end of the year. Sanders Aviation, Inc., Riverdale, Md., world distributor for the two-control spinproof plane manufactured by Engineering & Research Corp., is concentrating activity on the forthcoming models.

BRIEFING FOR DEALERS & DISTRIBUTORS

COURT FIGHT STARTS—Alleging that Veterans Administrator Carl Gray has "abused his discretion" in requiring an "unwarranted burden of proof" from veterans desiring to take vocational flight training, a suit has been filed in Federal court in the District of Columbia naming as defendants Gray, H. V. Stirling and F. W. Kelsey, assistant administrators, and A. H. Monk, training facilities director. Plaintiff is W. G. Slocumb, Jr., of Portsmouth, Va., a veteran who is a commercial photographer and seeks flight training in order to become an aerial photographer.

Suit is backed by American Veterans of World War II. It asks that the court require VA to accept "the bona fide declaratory statement of the applicant that he will use the training in his business" as sufficient evidence, without requiring the exhaustive inquiries now being made by VA into the intent of veteran flight training applicants, and the "complete justification" now demanded.

(Typical of the justification now being asked is a statement from the Atlanta Regional VA office: "A veteran will have submitted complete justification when he submits such facts and evidence as to make it reasonably impossible to conclude that the course of flight training is not connected with his present or contemplated business or occupation. If any facts or elements to show the connection between the flight course and the present or contemplated business or occupation are lacking then the justification falls short.")

$1,000,000 IN SALES—George Haddaway, the well-known aviation ambassador from Texas, calls to our attention the outstanding record of J. D. Reed Company, Beech distributor at Houston. Since the first of the year Reed's Beech sales have totaled over $1,000,000 which is an excellent record in any year, but particularly good in 1948 and tops among Beech distributors in the nation.

In addition to the main operation at Houston, the company has facilities on Love Field in Dallas, and at New Orleans Airport. Reed is now starting to build a new $350,000 hangar at Houston which will accommodate two rows of multi-engine planes with space for four-place Beech Bonanzas between the larger planes.

NAVY CHANGES MIND—Navy decision not to reactivate Opa Locka airport, outside Miami, Fla., means that commercial operators who have been making their plans to pack up and get out will be able to stay at the huge field. Particularly pleased are the operators of Embry Riddle International School of Aviation, one of the biggest aviation training operations in the South, and largest operation on Opa Locka field.

AGRICULTURAL USES MEETING—Further development of the National Flying Farmers Association proposals to establish a combined national research project on use of the airplane in applying insecticides, fungicides, and herbicides and in aerial seeding is expected at a conference to be held in Chicago, Nov. 30. Participating will be federal and state government officials, commercial dusters, agricultural college representatives, chemical manufacturers and aircraft manufacturers.

REORGANIZATION OF NATIONAL FLIGHT—Revamped plan to merchandise flight training which involves a campaign to enroll 1000 flight training operators in the program has been announced by National Flight System, which is closing out its agency set-up.

Under the new plan, NFS will provide a sales supervisory staff including five regional directors, 40 district managers and 120 sales supervisors, who will work with sales organizations of the individual operators in reaching a new mass market of persons who have not heretofore been interested in flying. Robert Pike, vice president and director, said in a Washington news conference that under the plan the student could buy a flight membership under financing plans for as low as $15 a month. Plan, as heretofore, sells eight hours of flying, or enough to solo, plus a six-month home study ground school course together with a discount arrangement making it possible to buy enough flight time for a private pilot's license. Total cost, including membership, is around $500 as compared to about $460 which Pike says is average cost of getting private pilot's license in usual manner.

—ALEXANDER McSURELY

By August 31st, 1948

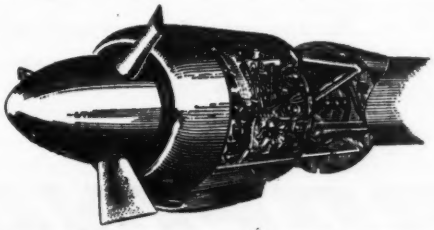
The **MAMBA** *had completed*

5000 *hours development running*

500 *hours endurance test*

150 *hours civil and military type test*

100 *hours flying*



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Right now—in the engineering department of the Boeing Airplane Company in Seattle, Washington—are openings for graduate (or the equivalent) aeronautical, mechanical, electrical, and civil engineers. For servo-mechanism designers and analysts there are unusual opportunities.

At Boeing your engineering skill and imagination will be applied to the most advanced military and commercial types of aircraft. The work involves all phases of aircraft design, from the detailing of small parts to the layout of major components, stress analysis, weight control, vibration and flutter analysis, research, development, and all associated engineering work required for completion of the design of the final product.

There's a future for you at Boeing where the current backlog of business totals more than $400,000,000. Outstanding engineering research facilities are available to you. Your associates will be the men who have contributed to Boeing's reputation for leadership in aviation research, design and engineering.

To all these advantages that Boeing offers you, add the fact that living is pleasant in the Pacific Northwest. No extremes of heat and cold. A wide variety of recreation is available the year round—fresh and salt water sailing and fishing, skiing, golf, and mountain climbing.

Similar openings are available in the Boeing-Wichita, Kansas plant. Inquiries indicating a preference for Wichita assignment will be referred to the Wichita Division.

For an illustrated brochure, "As the Twig is Bent," on Boeing engineering, and additional information about the opportunities discussed here, write "Personnel Office, Engineering Division, Boeing Airplane Company, 7752 E. Marginal Way, Seattle 14, Washington."

ANSWERING YOUR QUESTIONS

1. What about housing? *Recent new employees have had no difficulty. Our Personnel Unit will give you all possible assistance in finding suitable housing.*
2. What are opportunities for advancement? *Opportunities in all engineering units are virtually unlimited and depend primarily on training, ability and application of the individual.*
3. Does Boeing need men with advanced training? *Definitely yes. Men with advanced training and degrees are very much in demand and command correspondingly higher starting wages.*
4. What are the working hours? *Normally an eight hour day and five day week—8:00 to 4:30 daily.*
5. Is there a formal school or training program? *New engineers are normally placed in a group commensurate with their qualifications. A short training program carried on concurrently with design assignments is given for familiarization with Boeing procedures and practices.*

ADDED ADVANTAGES OF WORKING AT BOEING

1. Two weeks vacation with pay.
2. Ten days sick leave per year — if necessary.
3. Low cost group medical plan.
4. Low cost accident and health insurance.
5. Unusually attractive group life insurance.

For the Air Force, Boeing is building the B-50 bomber, XB-47 jet bomber and C-97 transport; for the Army, the L-15 liaison plane; and for six major airlines, the twin-deck Boeing Stratocruiser.

BOEING

P.R. Nonskeds Challenged on Safety

CAB hears complaint that travel agents cut carriers' returns so low that maintenance suffers.

Belief of nonscheduled skycoach operators that low cost transportation and air safety can go hand in hand is being seriously challenged.

Clouds of criticism are enveloping the bustling operations being conducted by irregular lines between New York and Puerto Rico. The situation has already stirred Federal action.

Transcontinental operators, fearing they may be hurt by ricocheting actions against the Puerto Rican nonskeds, ponder these facts: their business largely depends upon traffic generated by travel agencies; one New York travel agent handling some of the Puerto Rican business has been indicted for violations of the Civil Aeronautics Act by selling tickets below tariff minimums filed with the Civil Aeronautics Board; and an assistant U. S. attorney has made the withering charge that the cutthroat tactics of some ticket agencies on the Puerto Rican business have reduced carrier revenue to such a point that maintenance has suffered and safety is endangered.

▶ **Call for "Policing"**—Possibly with this situation in mind, R. R. Hart, president of the Non-Certificated Air Carrier Assn. (formerly Independent Air Carrier Assn.), has called for a program of "internal policing" of coach-fare ticket agencies by the carriers. Hart, who also is president of Viking Airlines, one of the transcontinental irregular operators, told a special meeting of association members that "the time has come for us to establish order within our industry and to make the public aware that low cost in air transport does not imply reduction in safety and reliability."

Pointing to the recent financial difficulties of several air travel agencies in New York which offered $88 transcontinental tickets, Hart said there is a point below which it is economically unsound to reduce air passenger fares. "Passengers who pay cash for transportation one night must have assurance that the agency taking their money will be in business and prepared to deliver the following day." Viking and other major coast-to-coast nonskeds have been charging $99 one way.

▶ **Dependent on Travel Agents**—Hart said that since nonskeds are almost entirely dependent on travel agencies for business it is part of the carrier's responsibility to guarantee the reliability of the agencies to the traveling public. Accordingly, Hart continued, the Non-Certificated Air Carrier Association will accept applications for approval from agencies handling coach fare tickets and examine the companies to determine their financial responsibility. Approved agencies will be given use of a seal which may be displayed in their offices and used in their soliciting advertisements.

The Association's action followed an incident in which 41 persons purchased $88 transcontinental tickets from a New York agency, which promptly vanished. Nonscheduled carriers came to the passengers' rescue, hauling them west, and the police dropped an investigation.

▶ **No Let-up Seen**—But CAB's investigation of skycoach nonskeds and ticket agencies serving them shows no sign of let-up. Board investigators have been busy in Los Angeles, San Francisco and Seattle gathering data on transcontinental and Pacific Northwest-Alaska service. Public hearings may be held and more indictments sought.

It was a recent New York CAB hearing on the Puerto Rican service that resulted in a grand jury indictment of the New York travel agency. At that Board hearing, one travel agent servicing the Puerto Rican trade testified that southbound DC-3 tickets sold recently for as little as $15 to $20. Nonsked DC-3s make the Puerto Rican flight via Miami, and the terminal-to-terminal trip is about 2140 miles. Thus cutthroat competition has made one-cent-a-mile air transportation a reality.

Fare on Pan American Airways' new tourist class DC-4s, which fly the direct 1612-mile route to San Juan, is $75, or 4.6 cents a mile. (PAA's 63-seat coach-type DC-4s have averaged better than 80 percent load factor during their first 50 days operation despite intense nonsked competition.) Regular New York-San Juan airline passage is $133.

Irregular lines which offer uneconomic southbound fares to Puerto Rico expect to make up the deficit on the northbound run, where space is more in demand. Last year, 101,000 persons traveled from Puerto Rico to the U. S., against 61,000 who made the reverse trip.

▶ **High Commissions**—New York travel agencies doing business with uncertificated airlines on the Puerto Rican run generally earn around 20 to 25 percent commission on ticket sales. But sometimes their return is 50 percent or more, while on a few occasions they take a loss on their sales. By contrast, the certificated airlines pay 5 percent commission to travel agents on domestic ticket sales and 7½ percent on foreign transportation.

Often ticket agents for New York-Puerto Rico nonscheduled lines have no idea what carrier will fly the passengers they book. Even if people are

AERIAL PILGRIMAGE

A journey to Mecca no longer means a long and arduous trip by land or sea for devout Moslems who live far away from the holy city. An increasing number of pilgrims are taking to the air. Picture shows the last of 30 Arabs who recently left Tunis for Mecca via TWA. Three women were in the group, one of them 86 years old.

booked for a specific airline, the ticket agency may be entirely ignorant of that carrier's legal tariff. And the carrier frequently does not know (and may not want to know) what the agency charged the passenger.

Conditions are not as chaotic now as they were in the spring of 1947, before CAB required the irregular lines to file tariffs, but they are still bad. A frequent practice is for an agent to assemble a group of passengers going to Puerto Rico on a specific day. The various nonskeds flying that day phone to solicit the business, but the agents hold on to their passengers until the weakest line quotes the lowest price. To be sure its passengers aren't left stranded, an agency may withhold part of its payment to the carrier until the flight is completed.

Agents are sometimes so confused by the number of different carriers soliciting business that they don't know who owns the planes providing the transportation. Some nonskeds have operated under more than one name at the same time.

▶**Equipment Examined** – One travel agent said he made it a practice to go out to the airport with his passengers to look over the planes they would use to make sure coffee and lifesaving equipment were aboard. He asserted that he had taken passengers off one plane because there weren't enough seats to go around and people were standing up when the craft was ready for takeoff. On two other occasions (involving different lines) the planes were not sufficiently clean, and at still another time the agent refused to let his passengers fly on a ship with broken and torn safety belts.

"Once I went to the airport early and saw the mechanic working on the ship," the agent continued. "The mechanic told the pilot he couldn't fix the plane until the next day. But the pilot insisted on leaving, so I took the passengers off."

The carriers are usually well acquainted with each other's operations, and on occasion there are pooling arrangements to take care of less than planeload groups of passengers. One ticket agent said fist fights sometimes occur between personnel of the carriers in the tense competition for business.

▶**Fight At Airport**–He described a recent tussle at Teterboro, N. J., airport between the agent and pilot of one operator and the agent and pilot of another carrier. "Plenty of fellows get black eyes," he declared. More often, however, one carrier agrees to take another company's passengers one day, and the exchange is reversed the following day.

Some agents charter planes. They contact different carriers, and whoever offers the cheapest rate gets the business. A DC-3 rents for perhaps $1550 or $1600 a roundtrip from Teterboro to Puerto Rico, regardless of the number of passengers carried. When the time of departure arrives for the chartered plane, the agent may find he has insufficient passengers and may lose money on the deal. He then may start calling other agents and carriers, frantically offering passage at almost any price.

▶**Advertisements Misleading** – Advertisements of some ticket agents are mere "come-ons", one agent testified. New York-Puerto Rico tickets may be advertised for $28, but when the customer enters the office he is told the price is $28 for transportation, plus $8 or $10 for insurance and $2 or $3 for food aboard the plane.

A passenger may pay up to $112 for his ticket. Once aboard the plane, he may find his fellow travelers have paid variously $40, $70 and $100 for the same accommodations. "There are complaints on almost every flight," CAB investigators were told.

"From my own personal experience, I realize that a company can't make money flying passengers (to Puerto Rico) at $25 or $30 each," one ticket agent declared. "I know the time will come when there will be plane crashes."

Challenger Certificate Extended into 1950

The Rocky Mountain area from Denver and Salt Lake City north to Billings, Mont., has been assured of feeder service for another 16 months as the result of a CAB decision granting Challenger Airlines a one-year certificate extension.

In permitting Challenger to stay in business at least through Mar. 30, 1950, CAB said the carrier's operating results show continued improvement. The company's three-year certificate was issued in March, 1946, and would have expired next Mar. 30 had the extension not been granted. Late last summer (AVIATION WEEK, Sept. 13), CAB refused to extend Florida Airways' certificate beyond Mar. 28, 1949, stating that this feeder's operating results did not justify the mail pay subsidies necessary to support the carrier's services.

▶**Year's Record**–During the year ended Aug. 31, 1948, Challenger carried 19,957 revenue passengers and flew 4,988,000 revenue passenger miles, 27,078 mail ton miles and 97,024 cargo ton miles. Passenger loads on the carrier's DC-3s varied from 2.23 a revenue mile in February, 1948, to about 6 in June, 1948, with an average load of 3.92 for the 12-month period ended Aug. 31.

From May 3, 1947, when operations began, until last Aug. 31, Challenger had nonmail revenues of $344,279, or 22.67 cents a mile, mail revenues of $917,861, or 60.45 cents a mile, expenses of $1,365,052, or 89.89 cents a mile, and a resulting net operating loss of $102,912.

For the year ending Aug. 31, 1949, Challenger expects to boost its nonmail revenues to $591,762, or 40.46 cents a mile, while mail income will be about $877,544, or 60 cents a mile, and expenses $1,371,461, or 93.77 cents a mile, leaving $97,845 net income. The company hopes to increase its average passenger load to 6.38 per revenue mile, partly through installation of additional navigation aids which will improve service dependability.

Challenger's balance sheet on Aug. 31, 1948, showed a net worth of $226,682. The company is in the process of issuing stock which, if fully subscribed, will yield about $640,000 to liquidate current obligations, provide additional working capital and enhance its financial position.

Post Office to Wait On Parcel Post Changes

Post Office Department is taking a "wait and see" attitude on proposals that air parcel post rates be lowered in instances where they exceed regular airmail rates.

This now occurs on low-weight shipments, particularly on long hauls. It results mainly from the fact that the 5-cents-an-ounce regular airmail rate applies to the whole country, while the air parcel post act sets up graduated rates for the eight postal zones. Under these rates an eight-ounce air parcel post shipment from New York costs 65 cents to Philadelphia, 70 cents to Atlanta or Chicago, 75 cents to Kansas City or Denver, 80 cents to Salt Lake City or San Francisco. Regular airmail rate on the shipment would be only 40 cents.

The Postmaster General has sweeping authority to change air parcel post rates and regulations. Deputy second assistant Postmaster General George Burgess said the Department is considering a regulation under which air parcel post rates in any category would meet the regular airmail rate. But the Department will postpone action until it has had several months more experience with the new service.

Only practical solution to the problem for the immediate future is for shippers to dispatch packages by regular airmail when it is cheaper. This involves the additional trouble of ascertaining the categories in which air parcel post is more expensive.

WILCOX - First Choice of PIONEER Air Lines

PIONEER EQUIPS GROUND *STATIONS WITH Wilcox Type 378A Package Radio

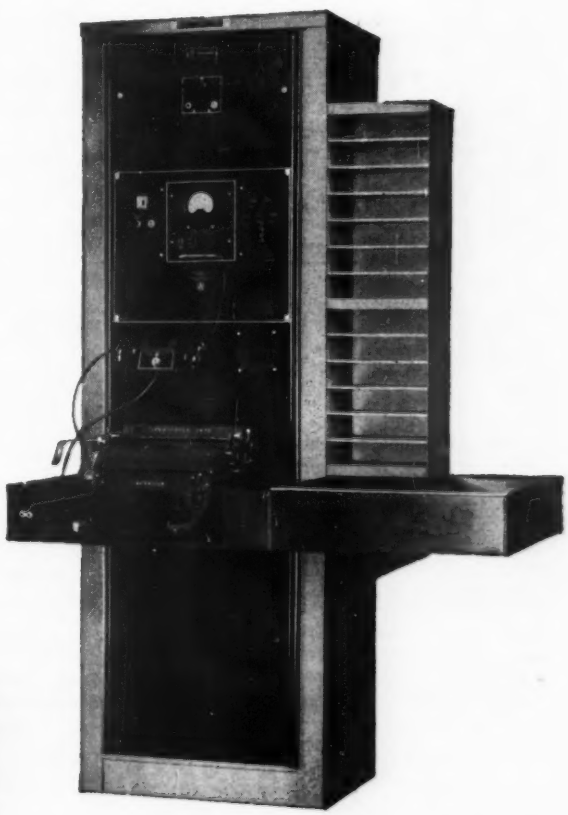
PACKAGE DESIGN SPEEDS YOUR INSTALLATIONS The Type 378A is *complete* from microphone to antenna, ready for connection to power mains. It is designed for aeronautical VHF ground-air communications at smaller traffic centers.

PROVEN COMPONENTS INSURE QUALITY AND PERFORMANCE—The Type 305A VHF Receiver and Type 364A VHF Transmitter (50 watts) are the principal components of the 378A. Long used separately and field-tested by leading airlines, these units are now available in package form.

NEW AIDS TO CONVENIENT OPERATION The telephone handset with its convenient push-to-talk button, serves as both headphone and microphone, with an auxiliary loudspeaker for incoming calls. The 378A includes desk front, message rack, and typewriter space—there are no accessories to be added.

LOCAL OR REMOTE CONTROL—If desired, the control panel can be removed and the 378A remotely controlled, either by re-installing the panel at the operating position or by simple adaptation to your existing control equipment.

**Pioneer aircraft are also 100% equipped with the new WILCOX Type 361A Airborne VHF Communication System.*



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Some Short jottings for airline operators, charter companies and V.I.P.s

WHAT THE PRESS IS SAYING OF FLYING BOATS

Flying boat opens land route

Elephants move to let plane land

From BASIL CARDEW

JOHANNESBURG, Sunday

A trip that started in Southampton Water finished after five days yesterday in a £1,000,000 reservoir outside Johannesburg—journey's end for Britain's newest flying-boat service over a land-locked route through the heart of Africa.

Captain Edward Rotheram, skippering the 35-ton Springbok Solent in its final proving run, put down on lakes and rivers on the 6,352-mile trail from Britain.

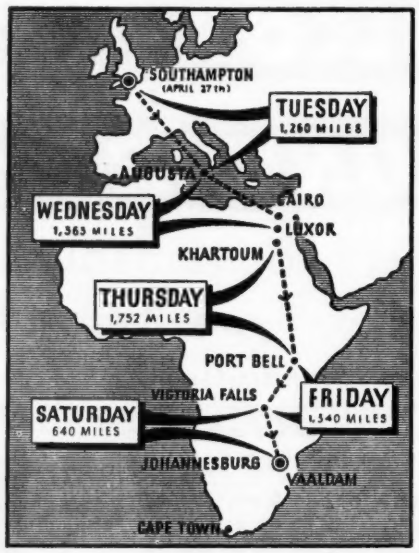
We were the first flying boat ever to "land" on the flooded Zambesi, four miles above the 400ft. Victoria Falls.

To make that possible, two herds of elephants had to be driven from their favourite watering-place. . . .

All mod. con.

The 31 passengers with me on the proving flight looked down from the two-deck plane on fleeing herds of elephants, on the country of the lion and the hippopotamus, on the crocodile swamps of equatorial Africa.

Inside the plane, cruising at 200 miles an hour over forest, scrub, and veldt, there were snug cabins, hot and cold water, a library, and the inevitable chromed cocktail bar. But this was customerless, because the service from three stewards made it unnecessary to leave one's seat. . . .



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"Give us flying boats every time" they say

"For speed, comfort, and ideal flying and sight-seeing conditions give us the flying-boat every time." This was the unanimous opinion of the "pre-view" party of 34 experienced British journalists and representatives of travel agencies who passed through Cairo yesterday on their way to South Africa in the Short Bros. "Solent."

Veteran journalists were enthusiastic about the trip. All agreed it was a fascinating form of travel and were eagerly looking forward to the stop at Luxor, the flight over central Africa, and a short stay in South Africa. . . .

The route which the Solents are to fly will be from Southampton to Augusta (Sicily) for the first night stop and thence to Cairo and Luxor, the second night stop, where passengers have an opportunity to visit the antiquities.

From Luxor the flying boats will cross the Sudan via Khartoum to Port Bell, on the north shore of Lake Victoria, for another night stop.

Then comes a 1,300-mile journey southwards across Lake Victoria, Tanganyika and Northern Rhodesia to the next alighting place and night stop, near the famous Victoria Falls on the river Zambesi. The last stage of the flight follows across Southern Rhodesia to Vaaldam, the Johannesburg terminal.

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NEWS CHRONICLE

New Worlds

THE possibility of world touring by seaplane opens up attractive prospects for British civil aviation. To travel by air has been, up to date, the resort of the man who was bent—single-mindedly and a trifle grimly — upon reaching his destination in the shortest space of time. But to most of us, more leisured or less intent, to travel remains quite as important as to arrive.

For people who are so minded the flying-boat, with its greater comfort and its more leisurely schedule, which allows something more than a mere glimpse of foreign parts, has attractions which the land plane cannot offer.

B.O.A.C. are well equipped to turn these attractions into a good commercial proposition. In Britain we have more experience than any other nation in operating flying-boats. Now that a new route has been opened to South Africa, we have proved facilities for such craft extending for more than twenty thousand miles across the world. A very prosperous luxury touring trade can be ours for the taking.

We can only take it, however, when that can be done without damaging our services in the fast commercial routes. Hitherto our flying-boats have been employed in eking out as best they can our meagre resources in long-distance land planes. We cannot take on new commitments until B.O.A.C. have been equipped with a fleet of air-liners which will enable them to meet all competition on the normal air routes of the world.

The new hopes of the flying-boats, then, are only added reasons why no efforts should be spared to build up, by purchase and construction, that great strength of British civil aviation which has been promised for so long, but which is so endlessly delayed in the achievement.

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Two Airline Officials See Brighter Future

Top airline executives are taking a brighter view of the industry's future in their public statements.

Ralph S. Damon, American Airlines president, told the Oklahoma City Chamber of Commerce recently that the carriers will soon begin to show profits "provided economic conditions do not change radically." And Warren Lee Pierson, TWA board chairman, had some friendly words for the much criticized Civil Aeronautics Board during a company management meeting in Kansas City.

▶ **CAB Facing Responsibilities**—Pierson declared that a revitalized CAB membership has at long last become alerted to the industry's serious plight and is accepting its responsibilities for the encouragement and development of U. S. commercial aviation. He said the CAB has retrieved a bad situation which developed at a time when the Board was under-manned, over-worked and apparently reluctant to face rate and route problems as realistically as required by the collapse of air transport's war boom.

But TWA's chief executive also warned his supervisory personnel that a large part of the responsibility for solution of the airline's difficulties must be shouldered by company employes. "The Civil Aeronautics Act requires CAB, like the Lord, to help only those who help themselves," he declared.

▶ **American Cuts Costs**—Damon, in expressing cautious optimism, noted his company's success in cutting costs while building up efficiency. He said American's break-even load factor has been coming down steadily.

After remaining fairly constant at around 55 percent through 1943, spiraling costs lifted the break-even point to a peak of 82 percent in 1946. From this almost impossible figure, Damon continued, American had the break-even load factor down to the low 60s by midsummer 1947; but the DC-6 aircraft grounding drove it up again temporarily.

With the return of DC-6s to service last spring and the start of Convair-Liner operations in June, AA's break-even point dropped to 55.4 percent in September. By next summer, American hopes to have the break-even load factor down to 50 percent.

▶ **DC-3s Too Expensive**—Damon declared flatly that the relatively slow DC-3s have become prohibitively expensive to operate. He said that in a sense the DC-4s put in service during 1946 as interim aircraft were the industry's salvation. By early next year, American expects to have all its DC-3s and DC-4s in passenger service replaced by DC-6s and Convairs.

Large postwar capital outlays for new equipment were well justified, Damon asserted. He said the cost of operating DC-3s rose to 5.5 cents a seat mile last summer, while the seat mile cost on DC-6s was only about 2.75 cents and on Convairs 3.7 cents.

The American Airlines president emphasized that the airlines are faced with a contracting travel market, but even so are getting a larger share of the total business. Overall inter-city traffic dropped from 116 billion passenger miles in 1945 to 89 billion in 1946 and 67.4 billion last year. Estimate for 1948 overall inter-city traffic is 61 billion passenger miles.

▶ **Gain on Pullman Travel**—Last May the airlines carried 63.7 percent of the Pullman travel volume, compared with only 58.1 percent in the same 1947 month. Damon said that rail travel will fall off about 12 percent this year and bus travel 5 percent, compared with a drop of only 3.5 percent for airline passenger traffic.

American's efficiency program cut the number of employes per 10,000 available ton miles from 7.05 in 1946 to 5.68 in 1947. During the first nine months of 1948 the figure was further slashed to 5.01, and in September alone American had only 4.47 employes per 10,000 available ton miles.

Two Carriers Plan Trans-Pacific Service

Starting just ahead of Northwest Airlines' competing service, Pan American Airways planned to inaugurate the first direct scheduled flights between the Pacific Northwest and Hawaii during last week.

First PAA trip was to leave Seattle and Portland on Nov. 24 for Shanghai, via Honolulu and Tokyo. Thereafter, PAA's trans-Pacific flights from the Pacific Northwest will depart on Wednesdays and Sundays. A third weekly trip is slated to be started by Pan American next March.

Northwest Airlines' thrice-weekly flights from Seattle and Portland to Honolulu are to begin Dec. 2 (AVIATION WEEK, Nov. 8). Both carriers will use DC-4s on the route at the outset and will charge $150 one-way or $270 roundtrip—the same fare offered on the Los Angeles and San Francisco to Hawaii links.

Pan American Airways has asked CAB for $1.65 cents a plane mile temporary mail pay for its trans-Pacific route.

Northwest previously had asked the CAB for the same rate of temporary mail pay on its trans-Pacific route.

VEALERS FLY EAST

Upper midwest livestock dealers are taking advantage of airfreight to save time and avoid weight losses in moving veal calves into eastern kosher meat (freshly-killed) markets. Picture shows the first shipment of 54 vealers as it was being loaded aboard a C-47 operated by Air Cargo Express, Inc., at Holman Field, St. Paul. Seven hours later the calves were in the veal chop line of the Midtown Veal and Mutton Co., Newark, N. J. Shippers report that the calves, loaded at about 150 lb. apiece, can be taken off at their destination at nearly the same weight. Land movement to New Jersey would tie the animals up for six days, and they would lose weight despite feedings. Air Cargo Express, has three DC-3s and is charging about $6 per 100 lb. to haul the calves east.

CAB Clears Stand On Cargo Losses

Subsidization of passenger-carrying airlines' cargo operations to the extent that they would have a distinct competitive advantage over independent freight services is not in prospect, according to the Civil Aeronautics Board.

This assurance was given in a recent policy statement which clarified an earlier opinion stating that "losses incurred by the certificated airlines in cargo operations must be underwritten by mail pay to the same extent that passenger operations are underwritten" (AVIATION WEEK, Oct. 18). The initial finding, made in Braniff Airways and Delta Air Lines mail rate cases, was strongly attacked by the Post Office Department, freight forwarders and independent air freight operators.

► **Distinction Sought**—The Board was told that for mail pay purposes there should be a distinction between all-cargo operations and combination passenger-cargo services because, unlike passenger traffic, all-cargo business has been developing satisfactorily independent of subsidy. Therefore, it was argued, the Civil Aeronautics Act does not authorize mail pay assistance to all-cargo service.

CAB replied that although this contention warrants serious consideration it is still not clear that subsidy payments are not needed for a time, at least, to insure proper development of the air freight industry by making regular all-cargo service available to population centers of proximity. "The record of the non-certificated carriers indicates it might be possible to conduct an all-freight service profitably on a long-haul basis between a few large cities, although up to the present all of these companies have sustained losses."

► **Abuses to be Prevented**—CAB emphasized, however, that it has power to prevent subsidized companies from effecting competitive abuses or establishing unsound rate structures which would destroy the ability of independent air freighters to compete on fair and equal terms.

The Board reaffirmed its decision to underwrite with mail pay a minimum cargo schedule of five flights weekly operated by Braniff between Chicago and Dallas during a past period in an effort to develop new business. But CAB warned all certificated passenger-carrying airlines that it would not force the public treasury to bear the losses resulting from cargo schedules in excess of the minimum pattern necessary to determine whether sufficient business is available for a potentially profitable operation.

Court Delays CAB Exemption Order

Acting at the request of 15 certificated trunklines, the U. S. Circuit Court of Appeals in Chicago has delayed execution of CAB's Sept. 8 order granting operating privileges to air freight forwarders (AVIATION WEEK, Sept. 20).

The Air Freight Forwarder Association plans to ask the court to reconsider its stay order, and CAB may make a similar move. Meanwhile, the Board is obeying the Court of Appeal's order which prevents issuance of more freight forwarder letters of registration.

In adopting new regulations and issuing an exemption last September, CAB had said it would permit the forwarders to function as indirect cargo carriers for a period not to exceed five years. The Board had authorized issuance of letters of registration to 58 designated forwarders and placed no limit on the number of additional companies which might qualify for operating privileges.

► **Show Reluctance**—But the air freight forwarders have shown an unexpected reluctance to take advantage of the operating privileges offered. Up until the Chicago court's stay action, only 27 forwarders had applied for letters of registration; and CAB had actually issued letters to only five: Emery Air Freight Corp., New York; Airborne Flower Traffic, Inc., San Francisco; All-Air Freight Co., Inc., New York; Peter A. Bernacki, Philadelphia, and Flying Cargo, Inc., New York.

The petition filed by the certificated airlines challenging CAB's decision stated that the Board had superimposed on the existing air transport system a duplicating system of indirect air carriers which will compete with the direct air carriers for freight business. In a dissenting opinion last September, CAB member Harold A. Jones stated that the Board, in effect, was letting "anyone with a three-cent stamp" into the air freight forwarding business.

Hearing Set on NAL

The Civil Aeronautics Board has reaffirmed its determination to follow through, as quickly as possible, with its investigation to determine whether transfer of National Airlines' routes to Pan American Airways, Delta Air Lines, Eastern Air Lines and another appropriate carrier would be in the public interest.

Despite the wave of protest against the investigation, the Board will hold a prehearing conference in the case this week. Hearing has been set for Jan. 17 and oral argument for Feb. 28.

Dates assigned indicate that CAB's normal procedural pace has been stepped up considerably. Several other airlines, a number of municipalities and the Air Line Pilots Association have sought permission to intervene.

ALPA, whose members have been striking against National for nearly 10 months, pledged its continued all-out support of the walkout at the union's recent convention. Meanwhile, financial interests have redoubled their efforts to settle the dispute before the dismemberment proceeding gets far advanced.

Urge Fuel Tax Reduction

Immediate reduction of Tennessee's aviation fuel tax from 7 to 3½ cents a gallon and eventual repeal of the levy has been recommended by the state's Tax Revision Commission.

IDLEWILD CONTROL TOWER

A Sabena (Belgian Air Lines) DC-6 en route to Brussels flashed by the temporary control tower at New York International (Idlewild) Airport as this picture was taken. Officially dedicated last July 31, Idlewild probably will not have its permanent airport terminal facilities and control tower completed until the early 1950s.

SHORTLINES

▶ **British European Airways**—A six-day old strike by about 1000 mechanics which cost BEA around $360,000 in revenue ended after the workers agreed to discuss a new incentive bonus plan with management.

▶ **British South American Airways**—Air Commodore Herbert G. Brackley, BSAA executive director, drowned recently while swimming off Rio de Janeiro's Copacabana beach.

▶ **Chesapeake Airways**—Has gone into voluntary receivership, according to Fred P. Adkins, president. Company will continue to operate twice-daily roundtrips between Baltimore and Maryland's eastern shore under the receivership, Adkins said.

▶ **Chicago & Southern**—Reports $449,427 net income, equal to 88 cents a share, during first nine months of 1948.

▶ **Continental**—A CAB examiner has recommended that the carrier be authorized to serve Pecos, Tex., as an intermediate point between Carlsbad, N. Mex., and Hobbs, N. Mex., for a three-year period.

▶ **Colonial**—Was slated to inaugurate daily service to Malone, N. Y., this week.

▶ **Cuba Aeropostal, S. A.**—Has asked CAB for a foreign air carrier permit to operate between Havana and Miami. The Havana company now has temporary authority to fly the route on a contract basis and says its new application has Cuban government support.

▶ **National**—Had an $879,701 net loss for three months ended Sept. 30 against $629,424 loss in the same 1947 period. Gross revenue was $1,867,520 compared to $2,221,558 in the third quarter last year.

▶ **Northeast**—Showed a $7894 operating profit during September compared to a $75,000 loss in the same 1947 month. Passengers carried rose from 27,266 to 31,093.

▶ **Trans-Texas**—Has asked CAB to extend its routes east to Shreveport and New Orleans, La., west to Los Angeles, and north to Amarillo, Tulsa, Oklahoma City and Wichita, Kans.

▶ **TWA**—Wants CAB authority to serve both Zurich and Geneva, Switzerland, on its overseas route. Recent completion of Kloten Airport enables the carrier to serve Zurich with both DC-4s and Constellations. . . . TWA board of directors has authorized company officers to explore the possibility of offering common shares to stockholders on a pro rata basis.

▶ **United**—Has applied for a CAB exemption to serve military airfields in California, Utah, Pennsylvania and Massachusetts to handle military cargo during period Military Air Transport Service's operations are curtailed domestically by European needs. Slick Airways was given similar authority last September. . . . Revenue passenger miles flown in October dropped 11 percent from the same 1947 month, but freight ton miles gained 20 percent. Mail ton miles were up 25 percent and express ton miles rose 15 percent.

CAB SCHEDULE

Nov. 29—Oral argument on Board's enforcement proceedings against Mt. McKinley Airways and Golden North Airways. (Dockets 3415 and 3416.)

Nov. 29—Hearing in air freight route case. (Dockets 810 and 730 et al.)

Dec. 6—Hearing on TWA's complaint against Pan American Airways' Saudi Arabian service. (Docket 3264.)

Dec. 6—Oral argument in California-Nevada service case. (Docket 2019 et al.)

Dec. 8—Hearing on Pan American Airways' Guatemala City-Los Angeles/San Francisco route case. (Docket 3277.)

Jan. 3—Hearing in New England states service case. (Docket 2196 et al.)

Jan. 4—Hearing in TWA route consolidation case. Postponed from Dec. 13. (Docket 2581 et al.)

Jan. 10—Hearing on TWA's complaint against Seaboard & Western Airlines. (Docket 3346.)

Jan. 10—Hearing on Florida trunkline service. (Docket 2215 et al.)

Jan. 15—Hearing on Board's investigation of through service and interchange requirements at St. Louis and Memphis. (Docket 3426.)

Jan. 23—Hearing on Board's enforcement proceeding against Transocean Air Lines. (Docket 3244.)

Jan. 31—Hearing on additional service to Puerto Rico. Postponed from Jan. 5. (Docket 2123 et al.)

Jan. 31—Hearing on Board's enforcement action against NATS Air Transportation Service. (Docket 3456.)

Feb. 16—Hearing in reopened Mississippi Valley and Southeastern states cases. (Dockets 548 and 501 et al.)

Mar. 7—Hearing in southern transcontinental route case. (Docket 1102 et al.)

Sightseeing Success

Western Air Lines officials have reported enthusiastic reception for their half-hour sightseeing trips during the first annual Air Transportation Day at Los Angeles Airport, Nov. 14. Upwards of 100,000 persons visited the field.

WAL flew six DC-4 trips during the day, each filled to capacity. Of the 264 passengers carried, 90 percent had never flown before, and one-third were children.

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ASSISTANT SERVICE Engineers position desired with aircraft engine manufacturer or airplane manufacturer, by Maintenance Engineer. A & E, 8 years, Ground Instructor on aircraft engines 1 year, maintenance experience on primary trainer type engines and planes to transport types, including removal, cylinder overhaul, and installations of engines. Parks Air College graduate, former army Crew Chief and Aerial Engineer of C-47. Age 30, single. William Fulton, 2025 Calumet Ave., Toledo, Ohio.

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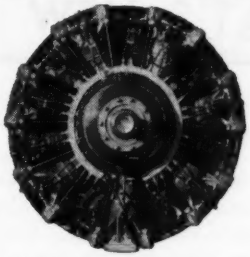

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ESSO'S CALENDAR SCOOP—Bulletin! AVIATION WEEK's annual Early Bird Calendar Trophy goes to **Esso Export Corp.** Its 1949 calendar reached our New York headquarters Nov. 22. As we recall, **Pan American Airways** was last year's winner in the aviation calendar field.

SADIE'S ELECTION COMMENTARY—American's literary DC-6 captain, **Hy Sheridan,** reports Sadie the Stewardess was so dazed by the election she has just made her first comment:

"Sadie says it sure is news when the polls go to the dogs."

GATTY GETS AWAY FROM IT ALL—How far from aviation can you get, asks **Bill Kroger,** AVIATION WEEK's New York News editor. He cites the case of **Harold C. Gatty,** Wiley Post's navigator on their record-breaking world flight in 1931 in the Lockheed "Winnie Mae." Today, Gatty is head of Island Packers, Inc., tuna canners in Samoa.

WATCH THOSE INITIALS—Every once in a while someone renames a government agency or an aviation enterprise without preparing for the initials. The latest instance is reported by **Randy Hawthorne** on **S. Paul Johnston's** editorial staff at the Institute of Aeronautical Sciences. Randy says a Central Air Documents Office has been established to conduct the joint technical intelligence work of Navy and Air Force. So, the former Technical Data Digest appears in a new cover dominated by the letters CADO. Randy's technical consultant says in Latin CADO means "I fall."

BITS ABOUT PEOPLE—**Winnett Boyd,** chief designer of A. V. Roe Canada, Ltd., receives the alumni medal of the University of Toronto for his work on Canada's first jet engine, the Avro Chinook . . . **Al Harting** is beaming again. Skylights, the employe-customer newspaper he edits for Southwest Airmotive, just received its second award of excellence within six months . . . **Fred Hamlin,** Flying's former Washington correspondent, is editing material being written by the Hoover Commission . . . **Max Karant,** former managing editor of Flying and now publications director of AOPA, won the Ercoupe class race at the Wings Field Regatta. His navigator was **Arnold Nicholson,** managing editor of Country Gentleman . . . **Sydney Carter** was married Oct. 30 to **Josephine Ballow** of Dallas. Syd is now advertising and public relations manager for Luscombe Airplane.

Charlie Rheinstrom is named senior vice president of Erwin, Wasey & Co., Inc., in New York, top flight ad agency. He was a sales executive with American Airlines for 18 years, then established his own aviation consultant firm. He will devote all of his time to E-W, on analysis of clients' sales and merchandising problems.

The aircraft industry is hailing **Paul Fisher's** reportorial coverage of the Berlin Airlift in the fall edition of The Bee Hive, United Aircraft's quarterly magazine. The entire issue is devoted to this feature, by United's public relations director. The Bee Hive this year was judged the best black and white industrial publication in the world by International Association of industrial editors.

C. B. Allen has a simple explanation for the new soaring endurance record set in France by **Marcelle Choisnet** the other day—33 hours, 30 minutes: The flyer was working the thermals over U.N. . . . and from Tulsa **Capt. Max Balfour,** dynamo of the big Spartan School of Aeronautics, implies they need an assistant manager of the Spartan cafeteria. They've had so many short-term appointments there they've renamed it the Separation Center.

MORE PERSONALS—Tough luck for **Maj. Bill Long,** chairman of the Board of Pioneer Airlines. Fire ruined stables housing his polo and riding ponies. Eight were destroyed immediately and others were injured . . . **William R. Kent** of Memphis will be spending more time on lumber matters. His partner in the lumber business died recently. Bill is president of Southern Air Services and a director of McDonnell Aircraft Corp.

Wesley Raymond, credited with selling more personal planes to individuals than any other man in the world, has virtually recovered from injuries in that accident months ago. He is back at his base at Raymond Aero-Marine Corp., Daytona Beach . . . **Wayne Weishaar,** secretary of Aeronautical Training Society, has been made chairman of the public relations committee of National Federation of Private School Associations. The organization now includes more than 25 associations, which together represent 5400 private schools out of some 8000 now operating. Wayne and **Dr. T. B. Lyons,** president of Pittsburgh Institute of Aeronautics, are aviation's representatives on the Federation's Board. R. H. W.

WHAT'S NEW

New Films

"Catalog Number 11," a compilation of the latest 16mm sound films of the Princeton Film Center. Films have a running time ranging from 10 min. to a full hour. Both free and rental films are offered to all organizations with 16mm sound projector facilities. Eight sections, 100 pages, available without charge from the Princeton Film Center, Princeton, N. J.

"The Scientific Approach to Better Plastics," a 20-min. 16mm sound and color film demonstrating development of the plastics research project sponsored by the Plastics Materials Manufacturers Association in the laboratories of the Massachusetts Institute of Technology. Available from Society of the Plastics Industry, 295 Madison Ave., New York 17, N. Y.

New Literature

"Cold Finished Steel Bars," an eight-page bulletin describing finishing processes, guide to selection, AISI and SAE standard steel compositions, etc. Available from Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill.

"Airman's Directory," a 12-page booklet of midwestern weather bureaus, radio range stations, and control towers. Includes information helpful to private flyers. Available from Sky Service, Corp., Municipal Airport, Evansville, Ind.

"Index to NEMA Standards Publications," a compilation of standards designed to eliminate misunderstandings between purchasers and manufacturers. Available from National Electrical Manufacturers Assn., 155 E. 44 St., New York 17, N. Y.

"Bulletin No. 4811," a catalog of different type Pacific Western aircraft actuators with essential engineering data. Available from Pacific-Western Aircraft Products, Lynwood, Calif.

"NBS Circular 474, Automotive Antifreezes," consisting of 16 large two column pages, available from Superintendent of Documents, U. S. Govt. Printing Office, Washington 25, D. C., at a cost of 15 cents a copy.

New Address

Thomas B. Bourne Associates, Inc., air navigation and airport engineers, have moved their Washington offices to Dupont Circle Building, Washington 6, D. C.

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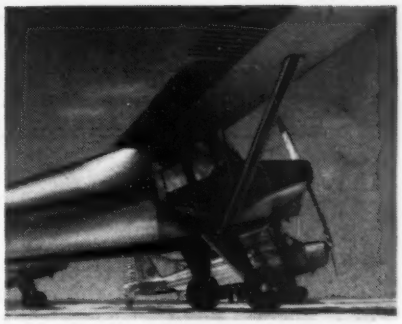

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EDITORIAL

Air Show Pays Off

AVIATION WEEK's editorial series, "Persuading Millions to Fly," cited on Nov. 1 the free air show held at Theodore Francis Greene airport at Hillsgrove, R. I., near Providence, to familiarize the public with commercial aviation.

Robert M. Howard, airport manager, reports an encouraging sequel:

"I want you to know how grateful we are for your generous comments in connection with the airport open house. . . . One of our principal reasons for holding the event was to get support for a three million dollar bond issue for airport development.

"I am glad to report that it was approved by a vote of better than 3 to 1, which is gratifying in view of the opposition to providing airport funds which has been encountered in some other places.

"I think the vote indicates we went about selling the airport in the right way.

"Put me down as a strong backer of your series of editorials on how to get people into the air. If you hear of anyone I can help in staging similar events, tell them to get in touch with me."

Hillercopter—Daring Enterprise

Licensing of United Helicopters' "Hiller 360" utility helicopter may stimulate new interest among major aircraft manufacturers and aviation financiers in the rotary wing industry.

The former will be inclined to watch closely the results of United Helicopters going into production with a machine Stanley Hiller, Jr., says he will sell at under $20,000 —approximately half the price of a comparable machine.

Two things will prompt financiers to take a new look at the helicopter industry. One is the "360" price tag. The other is realization that the comparatively low pricing comes without benefit of engineering and development costs having been written off by Government orders. The venture capital of some 3000 stockholders financed United Helicopters, and production initially is for commercial markets and without support of a Government contract subsidy.

Manufacturers and financial agencies alike will be giving United Helicopters, Inc., attentive study to observe, first, buyer reactions to the offering of a relatively low cost product, and second, UHI's ability to realize profits and write off development costs at such a price.

If Hiller shows a profit, financiers will be encouraged to sponsor new aircraft enterprises on the evidence that they offer development costs vastly lower than those attending a major aircraft company's designing and production of a new aircraft.

Similarly, success of the United Helicopters venture will prompt major aircraft companies to consider anew the idea of looking to small subsidiary companies, unencumbered by having to share big company operating costs, for new production items. Too, they will be prompted to invest in small companies having potentially good products that can be acquired when development has reached a point where markets and prices can be forecast.

These are not new observations, but they are given new meaning by the fact that at Palo Alto, Calif., a helicopter company is going into production of a licensed machine priced at a level many may consider to be illogically low.

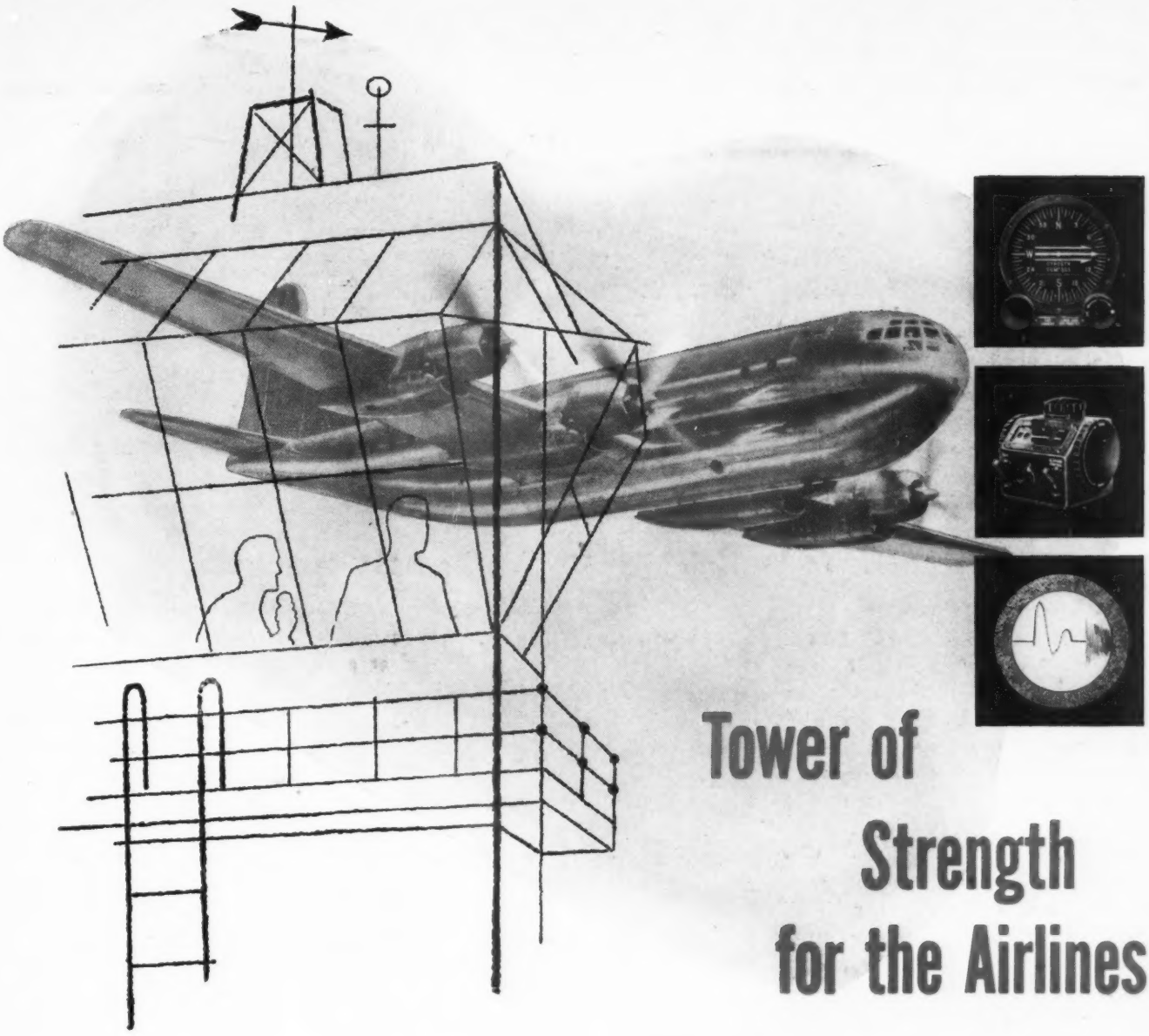
It is interesting to note that in the instance of United Helicopters, three major airframe plants showed active interest in acquiring Mr. Hiller's venture, and that east coast capitalists turned him down cold when he tried to obtain money, at the age of 20, to start his company after successfully flying his first experimental machine. Since then he has raised a little over $2 million in two California stock issues to see his UHI over the hump of development, certification, and initial production.

Aircraft manufacturers who originally approached Hiller failed to complete deals for various reasons. While one eastern company was red-taping negotiations laboriously through corporate executive committees, Hiller was wooed and won by Henry J. Kaiser—an association that lasted only a year. One west coast plane builder, anxious to have a helicopter for its personal aircraft stockshelf, made a cash proposal, but terms were not to Hiller's liking. Another western company, one of the largest, wanted to take over United Helicopters, but lacked liquid capital to clinch a deal.

This is not to imply that financiers and manufacturers have been short-sighted in their viewing of the helicopter. Their very existence dictates caution. Seldom are they justified in involving large amounts of capital without the support of successful precedent.

But, it seems quite possible that if a record of success is written on the books of United Helicopters during the coming year a powerful "precedent" will have been provided to justify strong financial and manufacturing advancement of the rotary wing industry, and lift this industry out of dependence upon military orders and high prices which stifle commercial markets.

ROBERT H. WOOD



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